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BY SIR JAMES BERRY, F.R.C.S. ENG., D.C.L.,

CONSULTING SURGEON AND EMERITUS LECTURER ON SURGERY TO THE ROYAL FREE HOSPITAL, LONDON.

FROM the point of view of the patient I sometimes doubt whether the progress of surgery has always been as beneficial as it should have been. Let us take the case of appendicitis. An idol that seems to be worshipped to-day by the majority of our profession, to say nothing of the general public, is the view that acute appendicitis is a terribly fatal disease and that it must be treated by immediate operation whenever possible. A wise old physician, universally respected, and now on the consulting staff of one of the larger London hospitals, and some years my senior, remarked to me only a few years ago, "I think the medical profession has gone quite mad about appendicitis," an opinion with which I cordially concurred. Some months ago I said to a friend of mine, a thoughtful well-informed middle-aged surgeon, attached to one of the London hospitals, "Surgeons nowadays seem to look upon most cases of acute appendicitis as they would upon a case of strangulated hernia, as cases that will die if not at once operated on." And his reply was "Well, is it not so?" Then I put to him this question: "In one year at St. Bartholomew's, in the days when I was house surgeon and house physician, long before the time of frequent operations, 31 patients were admitted to the medical wards with appendicitis, or perityphlitis as it was then called. They were mostly rather bad cases, with considerable swelling in the iliac fossa. Of these 31 cases, how many do you suppose died?" His guess was "something between a quarter and a third," and he was greatly surprised when I told him that the actual number was "one."

Since then I have put the same question to many others of my friends both medical and surgical, and most of them made guesses similar to the above; in one instance the answer was actually one half. The wise old physician already mentioned who had intimate knowledge of those early days, although himself attached to another hospital, was the only one who made an approximately correct guess by answering "two." I do not want to make too much of a single incident like this, drawn from a time when hospital statistics of appendicitis were by no means so accurate as they should have been, but there can be no doubt that in the minds of most of the younger doctors of the present day there is a grossly exaggerated idea of the mortality of acute appendicitis, when it is properly treated on common sense lines, and not necessarily by operation.

MORTALITY FROM APPENDICITIS IN THE OLD DAYS.

It is of course very difficult if not impossible to ascertain what was the real mortality of appendicitis in the old days when it was treated mostly by non-operative measures. A certain proportion of cases ended fatally, but such evidence as I have been able to get shows that it was not a very large proportion; and this is in accordance with my own recollection of those early days. An old friend of mine who has only recently retired after long years of general practice in a small midland town and surrounding country has recently reminded me that some 20 years ago he had asked me to give him directions how to treat his appendix patients when he saw them at the beginning, in their own homes. I had given him what I should call the usual common sense directions on what many would call old-fashioned lines, and he has followed them implicitly. He now tells me that he has never had a patient operated upon in the early stages of an attack and that he has never had a death from appendicitis in his practice during all these years.

There are but few, if any, English counties in which I have not at one time or another stayed in the houses of country doctors and discussed with them the problems of appendicitis. I have talked to many sensible thoughtful country practitioners both young and old, who have ridiculed the idea that appendicitis if properly treated without early or extensive operation is a very fatal disease. The older men, those brought up in the days when hospital physicians had much practical experience of appendicitis and gave sound teaching in its treatment, did not as a rule regard it as a very serious disease or find that operative treatment was very often required. All over the country there must still be hundreds of doctors, able thoughtful experienced men, who know as well as I do that appendicitis if properly treated from the beginning, and throughout the illness, by absolute rest in bed, by starvation, and by avoidance of all purgatives and enemata, is a disease of very low mortality; who know that it is only in a small minority of cases so treated that any abscess will form; that if an abscess does form it is better not to be in too great a hurry to open it, but to wait, watch, and exercise a wise discretion in the choice of how and when to operate.

Indeed I have heard it said, long ago, by experienced men well qualified to judge, that in such circumstances there was no mortality. And there was but little exaggeration in this statement. It is incorrect treatment, active injudicious treatment whether medical or surgical—for one may be as bad as the other—that does so much harm in acute appendicitis. If the operator is inexperienced there is to the patient much more danger in opening an appendix abscess prematurely and in the wrong way than there is in leaving it even to the point of allowing it to burst spontaneously, although this, I need hardly say, is not to be desired. Operations done when the abdomen is distended even when done by skilful surgeons, unless they have had much experience of appendicitis operations, are seldom worth doing. Such operations will save a life occasionally. In the majority of cases they deprive the patient of his last chance of life.

THREE PRINCIPAL CAUSES OF DEATH.

In the olden days, when patients were sometimes treated medically by too active treatment, on the ground that "you must do something, you know," there were, in my opinion, three principal causes of death.

1. Feeding the patient when he should have been starved.

2. Giving purgatives and enemata to get the bowels opened when it was of the utmost importance that they should be kept absolutely at rest so long as there was any risk of abscess forming.

* Part of the 157th Annual Oration delivered before the Medical Society of London on May 9th.

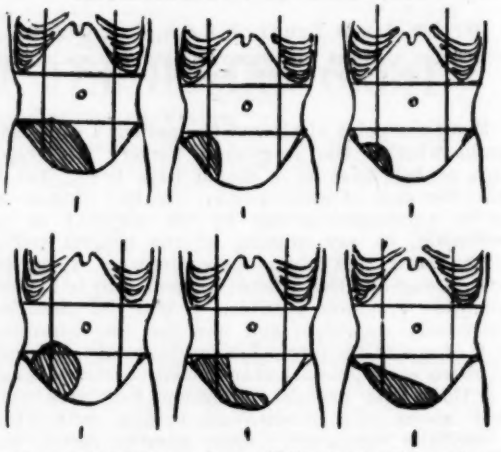
3. Attempting by means of drugs or otherwise to relieve the abdominal distension, which is protective and curative and not, as is so often thought, harmful in itself. Distension is often a grave symptom, but its sudden removal is often much more grave.

A striking instance of the evil effects of suddenly getting rid of distension occurred in the case of an old gentleman whom I saw in the country not many years ago. When I was first called to him there was already very great abdominal distension and the patient was much too ill in my opinion for any operation to have any chance of success. The doctor with whom I saw the case fully agreed with me. For several days he gradually got better; all the more acute symptoms subsided but the abdomen remained much distended and the bowels were not opened. There was no vomiting. Both the doctor and myself knew that the patient was getting well, but the patient's relatives were restive. To satisfy them, a well-known surgeon, a few years older than myself, was called in with my consent, but in my absence. He agreed that no operation was desirable, but unfortunately yielded to the friends' entreaties and, against our wish, prescribed remedies to relieve the distension. The bowels were freely opened, the distension disappeared, but the patient died of collapse a few hours later. There was no post-mortem examination, but there can be no reasonable doubt that this valuable life was thrown away by ill-advised interference. It is one of the very few cases of appendicitis that I have ever lost.

DANGERS OF FREE INCISION.

I am far from presuming to teach hospital surgeons who have had large experience and possess much operative skill in dealing with acute appendicitis. I know that there are numerous general practitioners of much experience and skill in such operations who have an advantage denied to most consulting surgeons in that they see their appendicitis cases earlier than do most hospital surgeons. These also I do not presume to teach. They often obtain admirable results in operating upon really early cases, and it is for them to judge whether the operation is or is not necessary. But this I do know, that anyone, be he general practitioner or hospital surgeon, who blunders into an appendix abscess without knowledge of the pathological condition which he may expect to meet with, and without taking the precaution either to limit his incision to the area guarded by adhesions or otherwise to prevent the diffusion of pus into the surrounding non-adherent peritoneal cavity, is courting disaster. When surgeons say and write, as they often do, that in the opening of an appendix abscess it is immaterial whether this be done through limiting peritoneal adhesions or through the unobliterated peritoneal cavity, they are talking dangerous nonsense. It is just the want of attention to this very point that is a fertile cause of disaster. This I pointed out in two letters to THE LANCET[1] 32 years ago, giving as I thought ample evidence of the truth of what I then stated. In one of these letters I gave statistics, from my own observations and knowledge, of 2 deaths only among 41 cases of abscess opened by incision through adhesions, and of 32 deaths among 39 patients treated by free incision into the general peritoneal cavity, an operation which was then beginning to become fashionable and which is now so common.

I do not claim that the two classes of case are in every respect strictly comparable, but approximately they are representative of the two widely different methods of treating appendicitis by two sets of surgeons in the same hospital in the 'nineties and also at the present time. In the same letter I published the six drawings here reproduced, all of which were drawn by myself in the post-mortem



Drawings of six fatal cases of appendicitis showing the exact areas of pus or adhesions in contact with the anterior abdominal wall. All of these had been operated upon by incisions without regard to the areas of adhesions. It is possible that timely incisions limited to the areas of adhesions might have saved all these patients.

room of St. Bartholomew's from the bodies of actual patients who had died after operations in which no attention had been paid to limiting adhesions. I was comparatively young, only 39, and quite unknown, when I wrote those two letters in which I first strove to stem the rising tide of reckless operating that I saw surging all around me. Some two years later (1902) Treves gave his celebrated Cavendish lecture.[2] It is a classic that should be read by everyone. It is full of practical and useful information as to the pathology, diagnosis, and treatment of appendicitis. Treves wrote, as I did, from observations made in the post-mortem room as well as in the operating theatre. One passage from that lecture, rarely if ever quoted nowadays, is of great importance:

> "There are advocates of what may be called indiscriminate operation. They use terms of this sort—'You must operate; the appendix is ruptured; there is a perforation; there is acute peritonitis; there is gangrene.' And mark—and this is the point I want to draw attention to—these expressions are used exactly in the same sense as you use such expressions as 'There is a perforation of the bowel; there is a perforating ulcer of the stomach; there is gangrene or hernia of the intestine.' And so they say an operation must be carried out even before a reasonable diagnosis has been made, as soon as an attack is suspected.
>
> "What I very seriously object to is this: that the two things are put in the same category. It is an absolutely false analogy and misleading. Is it for one moment reasonable to put perforation of the appendix in the same category with perforation of the stomach? It is monstrous. Not only can a perforation of a fair size occur in the appendix but a fair degree of gangrene may be met with without causing serious symptoms. I have found a concretion lying outside the appendix one month after an attack, when all the symptoms have subsided and without a single drop of pus."

Thus spoke Treves, from his own observations. From my own post-mortem observations I can fully confirm the truth of what he says. In the dead body of a person who had died of a totally different disease, I have myself seen an appendix the middle third of which had been completely destroyed by gangrene many years previously. It was represented

[1] THE LANCET, 1899, ii., 1857; and 1900, i., 197.

[2] See THE LANCET, 1902, i., 1817.

merely by a slender fibrous cord. And yet there had never been an operation and if there had been an abscess, as was probably the case, it had been completely absorbed without discharging either externally or internally. Such is the marvellous recuperative power of the peritoneum.

Two Historic Cases.

Let me tell you of two great historic cases of appendicitis separated from each other in point of time by nearly a quarter of a century. I know enough of surgical statistics to be aware that two isolated cases by themselves prove nothing, but I choose these two cases because they are, in my opinion, quite typical of the two modes of treating acute appendicitis which I want to contrast. I could relate equally well many similar cases of both kinds which I have seen myself, either in my own practice or in the practice of others, but for my present purpose, which is to illustrate how fashions change in surgery, these two cases are the most striking that I can give you. Both are world famous and the first had a great influence in spreading among the public the modern popular view about operations for appendicitis, a disease of which the public up to that time (1902) had scarcely even heard.

1902. CASE 1.—AGED 61.

Saturday, June 14	Abdominal discomfort.
Sunday, „ 15	5 A.M.: Seen by doctor for *acute attack of pain.* Afternoon: Seen by consulting physician. ? Rigor.
Wednesday, „ 18	*First seen by surgeon.* Temperature. Pain and swelling in right iliac fossa. Diagnosis "perityphlitis" (i.e., appendicitis).
Thursday, „ 19	Above signs disappearing.
Friday, „ 20	
Saturday, „ 21	Seen again by surgeon. Swelling nearly gone. Temperature normal.
Monday, „ 23	Seen by surgeon.
Tuesday, „ 24	OPERATION. Limited incision into intraperitoneal abscess. Much foul pus drained. Appendix not removed, not seen, not felt.
Afterwards	No recurrence. Lived nearly eight years.

1925. CASE 2.—AGED 54.

Sunday, Feb. 22	Very well all day.
Monday, „ 23	In night slight abdominal pain. 9 A.M.: Seen by doctor. 5.30 P.M.: *Severe abdominal pain,* doctor sent for. 6 P.M.: Tenderness and slight rigidity in right iliac fossa. 9 P.M.: First seen by surgeon. Immediate operation to be done. Moved to nursing home.
Tuesday, „ 24	12 midnight: OPERATION. Free incision into peritoneal cavity. Removal of appendix. Turbid non-odorous fluid. Intestines distended. Pelvis quite free from fluid.
Saturday, „ 28	Death. Post-mortem examination.

Both patients were treated, as was but natural in the case of such important personages, by famous surgeons of very large experience, probably the best surgeons that could be found in either country. I need hardly say that no shadow of blame could be attached to either of them. Each undoubtedly treated his patient by the method which he thought was best, and in both instances the operative treatment adopted, although widely different in the two cases, was in accordance with prevalent surgical opinions at the respective dates.

I.

Of the first case I can tell you something which is apparently not generally known by the present generation of medical men, still less by the general public. It has been well known to me for 30 years, and after this long lapse of time, I think that in the public interest it is only right that it should be known. I have not the slightest doubt that H.M. King Edward VII. owed his life to the wise discretion and skilful treatment, perhaps I should rather say the wise avoidance of any active treatment by his advisers, both medical and surgical, until the right time was judged to have come for surgical interference. And mark you, this right time was nine days after he had been first seen by the attending physician, and no less than six days after he had been first seen by the operating surgeon, six days after the time when on June 18th (I quote from the more or less official report) "the temperature was [then] elevated, there were swelling and tenderness in the right iliac fossa—in short there were symptoms of perityphlitis." I should like to ask you how many enthusiastic surgeons at the present day under the influence of the prevalent modern teaching would have refrained from operating at this much earlier period. As might have been foretold by anyone of much experience, and doubtless was foretold by the wise men under whose care he was, these acuter symptoms subsided; later the King was brought to London and next day, not the same day, an operation—as all the world soon knew—was performed upon him. Within a few hours of the performance of this operation I received a full account of it from one of the Serjeant Surgeons who was present and who saw exactly what was done. Later I received corroborative testimony from one of the physicians who was also present.

And what was the operation? All the world knew that it was an operation for appendicitis, that the King made a good recovery and that he lived nearly eight years longer and that he never had any recurrence. Few people knew even at that time that the appendix was not removed, that no search for it was ever made, that it was neither seen nor felt. A careful incision was made low down until an abscess was reached and opened; tubes and gauze were inserted and nothing more was done. What would have happened had this case occurred 25 years later, under the influence of the modern teaching that an appendicitis patient should be operated upon as soon as he is seen by the surgeon and the sooner the better? Who can doubt that most enthusiastic modern surgeons if they had followed their own teaching would have opened the abdomen freely, that the appendix would have been removed, or that, at any rate, an attempt would have been made to remove it. After a large experience of cases that I have seen, treated by both methods, and still more that have been related to me, I have but little doubt that the patient would have had little chance of surviving as long as eight days, to say nothing of eight years.

There is no little irony in the fact that the popularity of the modern operation of treating appendicitis by free incision and removal of appendix and abscess without regard to limiting adhesions is largely based upon ignorance of what was really done at this famous operation.

II.

Let us turn, by way of contrast, to the second case. Twenty-three years have elapsed, surgical fashions have changed. The septic focus, this dangerous appendix, must be removed at the earliest opportunity, and at any cost. Surgical technique has greatly improved, it is true, but the disease called

appendicitis remains what it has always been, even when it was not known by that name.

Another ruler of a great European State, President Ebert, also an oldish stout man, but seven years younger than the first, is on a certain Sunday (Feb. 22nd, 1925) in his usual health. In that Sunday night he felt a dragging pain in the abdomen of which he told his doctor, when next morning (Monday the 23rd) the latter paid a casual visit that had been arranged some days before. At 5.30 P.M. there was more pain; at 6 P.M. the doctor found marked tenderness in the cæcal region with slight rigidity. At 9 P.M. the patient was first seen by the surgeon, a university professor, a man of world-wide fame, one of the most celebrated and experienced in his country. On the ground of the local condition, and because it was considered to be an early operation (*Früh-Operation*) it was agreed that an immediate operation was required. The patient was removed to a nursing home and at midnight, that is, only three hours after he had been first seen by the surgeon, a free incision was being made into the abdomen and the appendix was removed together with much non-odorous purulent fluid. The intestines were much distended and it is expressly stated that the pelvis was quite free from fluid. For a day or two the patient seems to have done fairly well. Then distension, rapidity of pulse, restlessness, sweating, and so forth set in and on the sixth day (Feb. 28th) the patient died.

As I read the full and detailed original official account of this modern "early" operation, now so fashionable, when it was first published [3] I could not help feeling that I was back again in the good old days at St. Bartholomew's in the 'nineties. Back in the days when I, as surgical registrar, was myself seeing such things done and recording them in the post-mortem book and in my annual surgical reports.

Hospital Experience.

I have no reason to suppose that the treatment of appendicitis at St. Bartholomew's in the 'nineties differed materially from that which pertained at most other London hospitals at the same period. Corroboration of this view seems to me to be afforded by the admirable paper [4] published in 1904 by Cuthbert Wallace and Percy Sargent which gives details of all such cases treated at St. Thomas's Hospital during the ten years ending December, 1903.

Although I differ from them in some of the conclusions they drew from these cases, I cannot refrain from expressing my appreciation of the great value of this and similar reports based on the careful and detailed study of large numbers of cases. I wish very much that I had written a similar report on the cases that were under my observation at St. Bartholomew's at much the same period, instead of publishing them merely in the obscure and seldom read appendices to the statistical tables of that hospital. St. Thomas's has long been famous for the excellence of its abdominal surgery, and, if I may be permitted to say so, its reputation in this respect has recently been well maintained by a second equally admirable paper [5] published by B. R. Sworn and G. M. Fitzgibbon, another pair of surgical registrars at this same hospital. This latter paper is on the same lines as that of their distinguished predecessors, and deals with the ten years 1920 to 1929, inclusive.

[3] Deut. med. Woch., 1925, li., 448.

[4] Report of 1075 Cases of Appendicitis. St. Thomas's Hosp. Reports, 1904, vol. xxxiii.

[5] Analysis of 2126 Cases of Acute Appendicitis. Brit. Jour. Surg., Jan., 1932.

Without entering into any discussion of the conclusions arrived at by the authors of these papers I should like to draw attention to the facts contained in Table III. of the second paper and to the third conclusion which is that "if a palpable mass is present the best results are obtained by conservative treatment, where this is possible." This seems to me to be a notable advance on much of modern teaching.

I do not wish to discuss the question of removal of the appendix in a quiet interval. We all know that it is an excellent operation, although we also know that it is performed much too frequently and very often when there is nothing at all the matter with the appendix. Nor do I wish to say anything about the much discussed question of operating in the very early stage of acute appendicitis, an operation which is so fashionable at the present day. Personally I seldom see cases at this very early stage and when I do see them I rarely find it necessary to operate upon them. Throughout my life I have adopted the plan of not being in any hurry to operate, except in very rare and exceptional cases. Never have I had any reason to regret this practice.

I have been told that appendicitis is more common than it used to be; it has also been suggested to me that the type of infection has become more virulent. I can find no evidence for either of these statements and I do not believe them to be true. That the disease is recognised and diagnosed more frequently, and that active treatment is adopted far more often, there can of course be no shadow of doubt. That deaths are more common now than formerly is apparently an undoubted fact. According to the Registrar-General's latest published statistics the total deaths from appendicitis in England and Wales for the year 1930 were 2941.

It is not improbable that I shall be blamed for having again brought forward these views about the treatment of appendicitis. I shall probably be told that I am old-fashioned, not up to date, or that I am trying to set the clock back. I should maintain on the contrary that I am trying to introduce a little more sanity into the present-day treatment of acute appendicitis, a little more discrimination and judgment in the choice of operation, and when and how it should be performed when it is really necessary, a little less reliance on the hard-and-fast rule, adopted by so many, of operating at any and all stages—a rule so easy to follow, but often so disastrous to the patient.

I have spent half a century in watching and studying appendicitis in all its various moods and forms. I have seen nearly every form of treatment from the simplest to the most heroic. I do not believe that I can be wrong in my conclusions, I can only tell you what I believe to be the truth. Looking around me I am inclined to say that the prevalent surgical treatment of appendicitis, though still holding the position of an idol, is an idol whose pedestal is beginning to totter.

KING GEORGE HOSPITAL, ILFORD.—In 1931 the income was £20,303, and the year closed with a credit balance of £22. Thanks to the extension opened by the King last summer, the beds have been increased from 74 to 130, and the average daily number of in-patients consequently went up from 66·75 in 1930 to 97·56. On the average they remained for nearly three weeks; the average cost per bed was £3 5*s.* 2*d.* There were 7657 out-patients at Ilford and 6486 at the Becontree centre, and, together, there were more than 61,000 attendances, as compared with a total of 4000 patients and 12,430 attendances in 1930. In-patients increased by 467.

THE MODE OF ACTION OF VITAMIN D.

THE "PARATHYROID" THEORY: CLINICAL HYPERVITAMINOSIS.

By Leslie J. Harris, D.Sc., Ph.D.

(From the Nutritional Laboratory, University of Cambridge and Medical Research Council.)

Reference has been made in recent articles [1] to two important questions, the first of fundamental theoretical interest, the second of more immediate practical concern. Firstly, does vitamin D act by stimulating parathyroid function? Secondly, what danger is there of hypervitaminosis being induced clinically? Although these questions are still freely debated, it is my opinion that recent work has gone a long way towards providing reasonably definite answers to them both, and it may prove useful to summarise the evidence in bare outline.*

Action of Vitamin.

A review of the literature relating to vitamin-D deficiency, published several years ago,[5] led to a view of vitamin D action which has more recently been substantiated by intensive studies on the effects of vitamin excess, carried out in the Cambridge Nutritional Laboratory. Arguments deduced from vitamin deficiency may be summarised first.

PATHOGENESIS OF RICKETS.

In vitamin-D deficiency in humans or in experimental animals, as has been repeatedly shown, there is inadequate utilisation of the food calcium, or phosphate, or both, or, more correctly, an increased loss in the fæces. It may be that too little Ca and/or P is absorbed from the gut, or alternatively that too much is re-excreted back into the gut; possibly both mechanisms are involved—the evidence does not permit a definite decision at present—but we are entitled to say that the *net absorption* is decreased in vitamin-D deficiency.†

The inadequate net absorption can next be correlated with a deficient level of one or both of these elements in the blood stream. This diminution in the blood Ca or P, or the Ca × P product, is the real immediate cause of the bony irregularities and the clinical manifestations; so that rickets is aptly described as essentially a disease of the blood rather than the bone. Most frequently, actually, it is the blood phosphate and not the calcium which tends to be low in clinical rickets (low-phosphate rickets), but low-calcium rickets has also been described and readily produced experimentally; a low blood calcium in the avitaminosis is the cause of tetany. In *juvenile* and *adult rickets*, too, the pathogenesis is the same—viz., inadequate net absorption of Ca and/or P, hypophosphatæmia and/or hypocalcæmia, and hence a resulting defective calcification of newly forming bone tissue (or a similar net loss of mineral matter from fully grown bone, which is to be recognised not as a static but as a dynamic structure continuously gaining and losing mineral salts).

It is important to realise that deficient calcification in newly forming bone tissue follows necessarily whenever the blood Ca × P is low. Once we restore sufficient vitamin D to the diet, the net absorption improves, the hypophosphatæmia (or hypocalcæmia, whichever is at fault) is rectified, and consequently adequate calcification can now once again take place, so that evidence is seen of healing of the rickets (or there is cure of the tetany). The brilliant experiments of Shipley [6] and Robison [7] and their co-workers show that the same considerations apply to the calcification of bone in vitro.

A slice of defectively calcified rachitic bone will recommence to calcify normally when it is placed in saline having an adequate Ca × P product, or in serum from a normal animal—i.e., with the normal Ca × P product—but it fails to calcify when the Ca × P is low, as in serum from a rachitic animal. In other words, the extent of calcification is governed by the Ca × P product of the fluid medium bathing the bone.

The exact mechanism concerned in the actual precipitation of the calcium from the blood into certain sites in the bony tissue we know to depend, inter alia, upon the presence in the latter of an enzyme, phosphatase,[8] whose activity, be it stressed, remains fully normal in rickets.[9] Whatever may be the complexities of the calcifying mechanism itself, we may conclude that the error in rickets is not primarily in the bone but in the inorganic composition of the blood, and that vitamin D has the appearance of increasing the concentration of Ca and/or P which can be carried in the blood stream.‡

Admittedly the theory of vitamin D action outlined above has not yet won general acceptance. The orthodox continental view is that vitamin D acts directly on the bone; and no less an authority than Alfred Hess (for example) concludes that in spite of much experimentation no answer can yet be given to the question, why rachitic bone remains uncalcified, that the metabolic work on infants suffering from rickets presents a "mass of material that it is impossible to appraise," and that the main action of vitamin D appears to be other than on gut absorption of Ca and P.[10] But the theory accounts so consistently not only for the facts already mentioned but also for the phenomena of hypervitaminosis (see below) and for a further variety of observations now to be mentioned, that in my opinion little doubt can remain as to its essential correctness.

INFLUENCE OF FACTORS OTHER THAN VITAMIN D.

Obviously enough, for the vitamin to be effective in procuring an adequate net absorption of Ca and/or P there must be a sufficiency, absolute or relative, of available calcium and/or phosphate in the gut. Therefore, additional factors which must also to a large extent influence the net absorption (and the blood figure, and hence the consequent calcification) are the following: the Ca and P content of the diet; the Ca − P ratio of the diet (this affects the solubility of the Ca salt, and hence the ease of absorption); the acid-base ratio (which also governs the solubility, under certain conditions), &c. A high-Ca low-P diet will tend to produce hypophosphatæmia, and hence low-phosphate rickets, while a low-Ca high-P diet will tend towards hypocalcæmia and low-calcium rickets. All these expectations are borne out by the observed results.

Several puzzling observations may perhaps be explained upon the lines of the general theory given in the foregoing discussion.

(1) For example, it has been shown that in experimental low-phosphate rickets a change to a diet richer in phosphate will suffice to bring on sudden tetany. It suggests itself to the writer that the explanation here may be simply as follows: the provision of extra phosphate will force up the level of the phosphate in the blood; and, since we are to suppose that the deficiency of vitamin D keeps the Ca × P product low, it follows that the Ca must become

* The details of the experimental work principally referred to in the present paper, together with an extended bibliography, were given elsewhere (Harris and Innes, 1931[2]; see also earlier papers [3 4]).

† *Net absorption.* I have suggested [3] the use of this expression for denoting the intake minus the fæcal excretion. It is, of course, a measure of the gross absorption less the amount re-excreted back into the bowel.

P for brevity, denotes *inorganic* phosphate, not total phosphorus.

‡ The direct addition of irradiated ergosterol to serum in vitro does not suffice to increase the amount of calcium and phosphate which can be dissolved in it, according to unpublished work by the writer.

relatively depressed, and so tetany will ensue. (Other things being equal, a rise in blood P is accompanied by a fall in Ca, and vice versa.)

(2) Again, it is known that in low-phosphate rickets simple starvation may suffice to bring about evidence of healing in the rickety bone. In this case the explanation may well be that the blood phosphorus becomes raised as a result of the breakdown of organic phosphorus of the tissues and so gives rise to the observed calcification.

(3) Finally, an explanation may be sought for the observation that whereas in humans or dogs simple deprivation of vitamin D suffices to bring on rickets, in rats it is necessary to disturb the salt balance as well. There can be little doubt that here the explanation lies in the exceptional power of the rat to make full use of any calcium or phosphate obtained in its diet. Direct measurements show that whereas with either the dog or the human the utilisation of normal amounts of Ca and P becomes vanishingly small in the absence of vitamin D, with the rat the utilisation still remains comparatively good. Hence we can understand why it becomes necessary in order to secure frank rickets in the rat to upset the salt balance in addition; by so doing one is putting a further obstacle in the way of adequate absorption—e.g., in the case of the high-Ca low-P rachitogenic diet by rendering the Ca and P relatively insoluble.

HYPERVITAMINOSIS D.

Studies in the Nutritional Laboratory during the past three and a half years on the effects of vitamin D excess have served to substantiate the views summarised above as to the nature of vitamin D action. They have also provided a rational explanation of the nature of the ill-effects seen in the hypervitaminosis.

The empirical fact that excessive doses of irradiated ergosterol are toxic was first recorded by the German observers Pfannenstiel [11] and Kreitmair and Moll,[12] the latter drawing attention to the presence of calcium deposits in the soft tissues; but they were unable to throw any light on the meaning of the toxicity, suggesting only that the loss in weight of the experimental animals seemed to indicate an increased basal metabolic rate,[12] and that the lesions might be compared with cholesterol arterio-sclerosis. I predicted that the effects of vitamin excess would be found to stand in logical contrast with those of a shortage, the mode of action of the vitamin in excess being essentially an intensification of its normal action when given in small amounts. We wrote [3]:

"It would appear that there are low and high threshold values for vitamin D, below and above which there are caused deficient and excessive values respectively of blood phosphorus and/or blood calcium and resulting calcification."

A considerable amount of experimental work has served to confirm this view. Summarising our results in other words, we have shown that just as vitamin-D deficiency causes inadequate net absorption, low blood Ca and/or P, and resulting inadequate calcification, so vitamin D excess, on the other hand, brings about a greatly increased net absorption,[2] a tendency to hypercalcæmia and/or hyperphosphatæmia,[2 4] and excessive formation of densely calcified new bone.[2 13] These experimental results were interpreted as follows [2]:

"An increased vitamin D intake promotes increased absorption of Ca and/or phosphate from the gut (or diminished excretion into the gut), so tending to raise the level in the blood. With inadequacy of vitamin D, the blood fails to secure sufficient Ca and/or phosphate; with moderate amounts the blood succeeds in maintaining its approximate constancy of composition, while with large overdoses, hypercalcæmia and/or hyperphosphatæmia cannot be averted."

The overcalcification of bone is strikingly shown by radiogram or histological section (Figs. 1 and 2); the excessively densely calcified spongiosa are seen reaching far into the marrow cavity.‖ Analogous changes occur in the teeth; the cement becomes overcalcified and a remarkable overgrowth of cementoid is formed, which may become ankylosed to the alveolar bone; abnormal new deposits of dentine are put down (Fig. 3). Extensive metastatic calcium deposits are also found in the soft tissues, as originally noted by Kreitmair and Moll,[12] notably in the kidney and in the artery walls (particularly the aorta). There seems little doubt that these are due to the precipitation of the calcium salts from the highly saturated blood, and must be ascribed directly to the hypercalcæmia and/or hyperphosphatæmia per se, for the same result accrues also whenever the blood calcium or phosphate is raised to abnormal levels by other means—e.g., by administration of excessive calcium and phosphate, or by means of parathormone (see below). It is worthy of note that the kidney should be one of the sites most liable to receive massive calcareous deposits; and although admittedly this may be favoured by the immensely increased concentration of calcium salts passed through the organ, it can scarcely be without significance that the kidney is known to be richly provided with phosphatase, the enzyme which in bone is concerned in the process of depositing calcium. In fact I am informed by Dr. Robison that the kidney and the aorta among the soft tissues are exceptionally rich in phosphatase, and these, it will be noted, are the very sites which (after the bone) become most extensively calcified in hypervitaminosis.§ To complete our comparison between vitamin excess and deficiency, it may be mentioned that even the muscles have been shown to have an abnormally high Ca or P content in hypervitaminosis, contrasting with the deficiency common in rickets.

It has been shown further by the Cambridge workers that as the hypervitaminosis proceeds, abnormally large amounts of phosphate and calcium are excreted in the urine.[3 4 14 15] This, we would suggest, is readily accounted for as the natural response of the kidney, tending as it does towards riddance of the excess present in the blood, and here once again the same effect is seen in hyperphosphatæmia or hypercalcæmia induced by other means.

It was anticipated that the effects of vitamin D when given in excess would depend largely upon the Ca : P intake just as they do with minimal allowances of the vitamin and in hypovitaminosis. This has proved to be so. Each increase in the amount of calcium in the diet results, we find, in an increased severity of hypervitaminosis, for any given overdose of vitamin D.[2 16] This is the result to be expected: the greater the amount of Ca actually available for absorption the greater will be the ill-effects of excessive absorption and the attendant hypercalcæmia. This observation of course provides only indirect evidence of the action of vitamin excess upon net absorption; but direct measurements have been made to establish the issue beyond doubt. It is of interest to note (see Figs. 4 and 5) how clearly each extra addition of vitamin D to a diet tends steadily to raise the net absorption, while if the excess vitamin is suddenly withheld the diminution in net absorption which is to be expected on the basis of our theory sets in with dramatic intensity (Watchorn[15]), so tending to alleviate the effects of the hypervitaminosis.

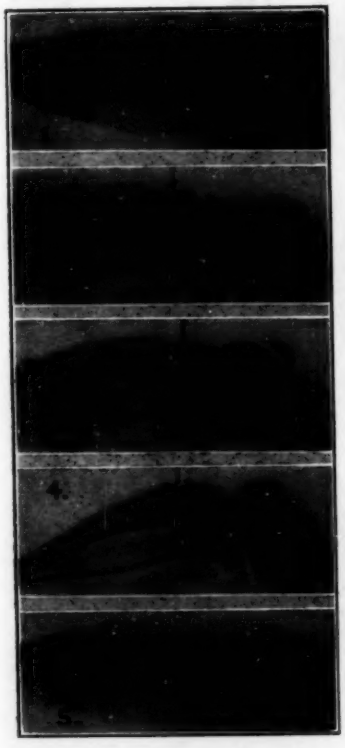
‖ With excess vitamin D osteogenesis is greatly increased, but I have suggested that this does not necessarily indicate any direct action of the vitamin upon the bone cells, for one may imagine that the formation of new bone is stimulated by and dependent on the previous calcification of the osteoid.

§ The presence of phosphatase in such tissues as kidney may possibly occasion surprise, but it must be realised that the "function" of the enzyme is to convert organic P into soluble inorganic phosphate—an action which clearly might there serve a useful purpose—and that under more normal conditions the secondary effect, the precipitation of calcium salts, would not be involved in sites outside the bone.

Many of the findings first reported from this laboratory, such as the raised blood calcium or phosphate, the increased urinary excretion, the excessive calcification of bone, and the influence of the Ca : P intake, have now been repeatedly confirmed by workers elsewhere, and there can be little doubt about the reality of the phenomenon of hypervitaminosis. The suggestion that the toxic action was due not to vitamin D but to the presence of toxic by-products—produced, it was claimed, when irradiation was carried out by the commercial German method in alcohol but not by the English method in oil [17 18]—has not been substantiated. The German workers Holtz [19] and Windaus [20] supposed the toxic "calcifying" substance to be different from the antirachitic, but no one has succeeded in obtaining a preparation which is antirachitically active and at the same time free from the characteristic toxic effect when given in excess.¶

Additional unpublished work is in good conformity with theory. Thus while the administration of vitamin D excess appears to have little or no significant influence on the phosphatase activity of the bones, experiments in collaboration with Dr. Robison show that the hypercalcæmic or hyperphosphatæmic serum of rats suffering from hypervitaminosis will induce an abnormally heavy calcification in bone slices in vitro—no such stimulation of calcification has been demonstrated for the vitamin itself acting direct upon the bone. As to the increased net absorption caused by vitamin D, the importance of excretion into the gut, as compared with absorption from the gut is being further studied. Whether the increased net absorption means that the vitamin acts in any primary sense upon gut function cannot be guessed without further work: diffusibility through the gut wall as affected by vitamin D is now being examined.

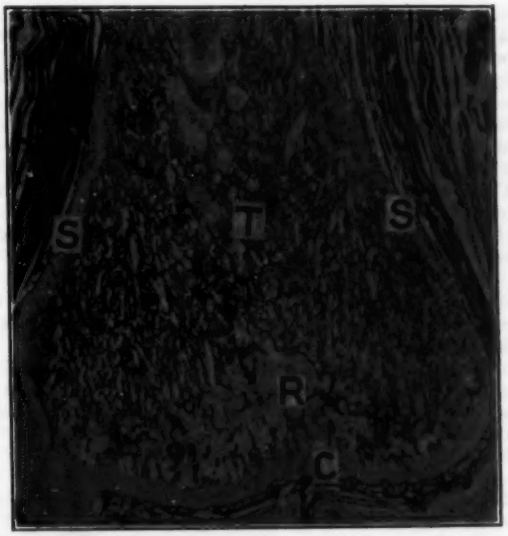
FIG. 1.



Radiograms of knee-joints of rats: rickets, normal and hypervitaminosis. (1) Rickets showing defective calcification at growing end. (2) Normal, adequately calcified. (3) Early stage of hypervitaminosis, showing commencement of excessive calcification at growing end. (4) Same, more advanced. (5) Later stage, complicated by severe illness and cessation of osteogenesis, showing less densely calcified band nearest epiphysis.

¶ Our early results led us to conclude that toxicity is an intrinsic property of vitamin D itself if fed in sufficient excess; but we did not rule out the possibility that certain by-products could be independently toxic.[3] Recently I have been able to confirm the toxicity of the pure isolated vitamin D (calciferol) and find indeed that its degree of toxicity is of an order sufficient to account entirely for the whole of the toxicity of the crude irradiated ergosterol from which it is obtained. At the same time however I am able to confirm that a preparation can be derived from irradiated ergosterol, as claimed by Holtz, which produces definite toxic symptoms at a relatively much lower level of antirachitic units. The possibility is being examined that the difference in the size of the toxic dose is due to the more ready absorption of the preparation in question, when given in excess.

FIG. 2.



Advanced stage of hypervitaminosis in growing rat. Distal end of femur (×21), showing excessive bone formation, the spongiosa (T) extending far into the marrow cavity. Secondary resorptive changes are apparent also in the cortex of the shaft (S), and to a less degree in the spongiosa (R) nearest the growth cartilage (C).

SECONDARY CHANGES IN EXTREME HYPERVITAMINOSIS.

Our references above to net absorption in hypervitaminosis relate to the primary effect observed, or to the condition of animals receiving *moderate overdoses* of the vitamin. If, on the other hand, *maximal* toxic overdoses are given, and continued for some time, so that the animal begins to lose weight rapidly, and refuses its food, one can no longer obtain evidence of this characteristic increase of net absorption with increased vitamin intake. This is due partly to the loss of appetite, so that little or no calcium is being ingested, but partly also to the breakdown of gut function which is seen in any animal when gravely ill. Partially starved controls on a diet which is normal in composition and restricted only in quantity show a similar failure in percentage net absorption of calcium or phosphate.[15]

Of greater interest, however, was our observation that when the maximal degrees of hypervitaminosis were reached, and no increased provision of calcium was allowed in the diet, there was, especially, marked evidence of resorptive changes in the bone. Fig. 2 illustrates the resorption of compact bone under such circumstances, and shows how spongiosa which had already become abnormally dense under the action of the vitamin D excess begin later to show a band less densely calcified at the growing end. The latter phenomenon, however, may perhaps be correlated with the general cessation of growth (resulting from the severity of the ill-effects) and the corresponding arrest of new bone formation. The conditions of these resorptive changes, we find, are such as to suggest the possible explanation that the bone is called upon as an additional source of calcium for the blood when the alternative available supply in the gut has become exhausted. We have indeed

succeeded in showing that as the calcium in the diet is reduced a relatively greater proportion of the extra calcium drawn into the blood does come from the bone. According to this suggested explanation a sufficient increase in the calcium of the diet ought definitely to prevent any decalcification in the bone. An unequivocal demonstration is difficult, however, because while we find that feeding extra calcium in hypervitaminosis does, as anticipated, increase the severity of the hypercalcæmia and the extent of calcification, the animal now succumbs so much more rapidly to these very ill-effects that a direct comparison of the bony changes is not feasible. There is also the secondary loss of appetite, and the consequent absence of the usual source of available absorbable calcium to complicate the direct comparison.

Notwithstanding the undoubted intellectual interest of the observation just discussed, it is essential to bear in mind, as we have previously emphasised,[2] that the primary action of vitamin D, which is of normal physiological importance, and which is equally apparent whether the vitamin is given in suboptimal amounts, in optimal amounts, or in moderate excess, is that described in the earlier paragraphs—viz., increased net absorption of Ca and/or P, raised Ca × P product, and resulting increased calcification.

COMPARISON OF ACTION OF VITAMIN D AND THE PARATHYROID HORMONE.

The knowledge that parathormone, like vitamin D, can bring about a rise in the blood calcium has recently led numerous writers to adopt the view that vitamin D acts simply by direct stimulation of parathyroid function. Noel Paton[21] had earlier supposed nutritional tetany to be in every way identical with parathormone deficiency, and Block and Faber[22] had postulated that irradiation (equivalent of course to vitamin D administration) cured tetany by stimulating the parathyroids. Various arguments are given for supposing that rickets and osteomalacia are due to faulty parathyroid secretion, e.g., Mirvish, 1930.[22a] The beneficial effects of cod-liver oil before parathyroidectomy were attributed by Jones[23] to parathyroid stimulation; and similar conclusions have been given by very many others, including notably Greenwald and Gross,[24] and Taylor, Branion, and Kay.[25] Hess described an experiment by which he claimed to have proved the connexion.[26] He stated that after the parathyroids had been extirpated vitamin D was no longer able to raise the blood Ca. Further experiments have not confirmed this conclusion, for it has been shown that provided a sufficiently large dose of vitamin D be given its characteristic action can still be demonstrated readily enough.

It is our contention that the available evidence indicates rather that the parathyroid secretion and vitamin D normally function separately and independently, their effect on blood Ca (or P) being only supplementary. The fundamental point of difference between the two, we have urged,[2] is that whereas vitamin D improves the assimilation of food calcium and/or phosphate—i.e., it increases the net absorption—no such action has ever been demonstrated for parathormone, which in contrast raises the calcium in the blood solely by withdrawing it from the bone. What little data have hitherto been published suggest that parathormone has but little effect on net

FIG. 3.

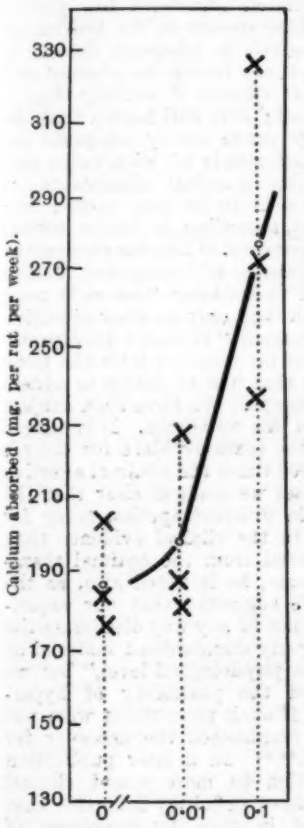
Above.—Sagittal section (×14) of molars of rat suffering from hypervitaminosis (on left); with normal for comparison (on right) (P, pulp; D, dentine; C, cement; M, periodontal membrane; B, alveolar bone). Note the overcalcification in hypervitaminosis—e.g., at alveolar crest (*b* and cement (C_1) leading to the formation of extensive cementoid overgrowth (C_2) ankylosed to the alveolar bone (some resorption in latter). Formation of abnormally large new deposits of dentine (*d'*).

Below.—Portions of hypervitaminous tooth, further enlarged, to show: (on left) overcalcification, and new cementoid growth; and (on right) new dentine (lettering as above).

Sections kindly prepared and photographed by Dr. E. W. Fish.

absorption of Ca and P, and if anything it tends to *diminish* it rather than increase it (see Greenwald and Gross [27]). Whereas the characteristic action of vitamin D in therapeutic doses or moderate excess is to increase the "retention" of Ca and/or P by the body as a whole, the only effect of the kind which has been demonstrated for parathormone is, on the contrary, a *loss* of Ca to the body as a whole owing to the increased urinary excretion. Quite consistently, the literature will be found to indicate always the same distinctive features for parathyroid action, no matter whether the data are derived from instances of hyperparathyroidism, from parathyroidectomy or insufficiency, or from parathormone administration—viz., resorption of mineral matter from bone, raised blood calcium and increased Ca excretion by kidney, with resulting loss of Ca to the body. In short, it seems unwarranted to suppose that vitamin D acts solely by stimulating the parathyroid until evidence can be produced to show that parathormone can bring about the increased net absorption so characteristic of vitamin D.**

FIG. 4.



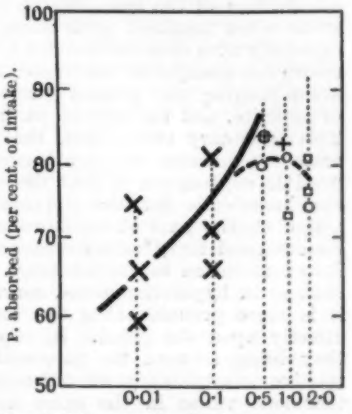
Irradiated ergosterol fed (mg. per rat per day).

Increasing net absorption of Ca with increasing intake of vitamin D (up to 5000 times the minimum effective dose). Circles and curve represent mean values. (From Brown and Shohl's figures.[16a])

Further experiments on these questions are still in progress in this laboratory, including more especially an examination of the effects of relatively small doses of parathormone in comparison with vitamin D upon normal and rachitic animals of various species. The results thus far are in keeping with the conclusions just given. It must be borne in mind that most past work on parathyroid function has been carried out on adult animals, sometimes on Ca-free diets, and principally with very large overdoses of the hormone. The conditions therefore have not been comparable with those employed in investigations on vitamin D action, and accordingly the influence of smaller doses of parathormone, and upon growing and vitamin-deficient animals, is now being examined in detail.

If we accept as correct the view of parathormone action outlined above, we need have no difficulty in accounting for the various observations which have been taken by other authors to indicate that vitamin D stimulates the parathyroid. Since, as we suppose, vitamin D and the parathyroid hormone both tend to raise the blood Ca, although in different ways, it follows that they will appear to augment each other, and hence any excess or deficiency of the one will influence the effect of an excess or deficiency of the other. But it is surely fallacious to argue that such evidence provides direct proof of an interaction between the two. Again it has been shown that parathormone injections have a more pronounced effect when large amounts of calcium are fed simultaneously; but the explanation here, it seems clear, is simply that the ingestion of extra calcium in the diet always tends to raise the blood figure (at least temporarily), so that the separate action of parathormone in

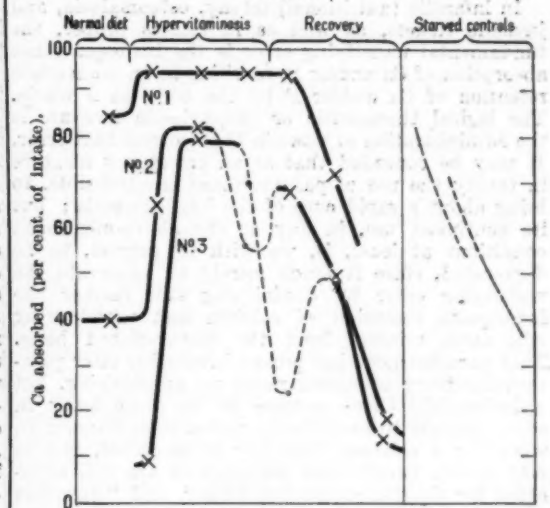
FIG. 5.



Irradiated ergosterol (mg. per rat per day).

Increasing net absorption of P with increasing excess of vitamin D complicated at the maximal levels of excess by the severe illness produced, which gives rise to loss of appetite and final failure in gut function (dotted line) (+, o, □, = cases showing loss of appetite, in increasing order of severity). (Harris and Innes' calculated from data of Brown and Shohl).

FIG. 6.



Net absorption of Ca measured during the course of a hypervitaminosis experiment on rats; showing the sharp rise in absorption as soon as the vitamin excess is first administered and great drop in absorption when the excess is discontinued. A secondary effect is seen in the case of rats Nos. 2 and 3 which had become gravely ill in the later stages of the hypervitaminosis, with loss of appetite and failure in gut absorption (dotted lines). A similar failure in absorption is seen in controls partly starved on a normal diet (on right) (from Watchorn's data).

** Our theory leads to the deduction that if parathormone excess induces hypercalcæmia by withdrawal of mineral from the bony reserves, this same hypercalcæmia should in turn tend to promote calcification in those regions of the bone which are more abundantly provided with phosphatase. This is in keeping with the observation that osteoid tissue may be well calcified in hyperparathyroidism.

the same direction is bound to be intensified; it would be illogical to suppose (as has been done) that this experimental result proves that parathormone increases the utilisation of food calcium.

We have mentioned above that very large doses of vitamin D tend to cause an undue density of calcification of the spongiosa in newly forming bone, while when maximal toxic doses are reached, more especially with diets not too rich in calcium, secondary resorptive changes in the over-calcified bone appear, accompanying the general growth failure, the loss of appetite, and the breakdown of gut function, &c. This secondary effect upon the bone clearly bears some resemblance to parathormone action, and a possible explanation is that the over-calcification in the bone calls for the appropriate compensating action on the part of the hormone. Taylor, Weld, Branion, and Kay,[28] who have recently independently drawn attention to the existence of resorptive bone changes in hypervitaminosis, consider, however, that it is more probable that the vitamin D is acting directly upon the gland. In support of their view they bring forward the interesting point that the relative susceptibility of different species to parathormone varies in the same manner as the ease with which they become poisoned by overdoses of vitamin D. However, before one can accept definitely the view that the action of vitamin D excess is due purely to increased parathyroid action, it will be necessary to explain certain suggestive differences between the lesions in the bone in hypervitaminosis and hyperparathyroidism. And again the occurrence, in common, of such abnormalities as calcareous deposits in soft tissues and high urinary calcium, which is also used as an argument for the supposed identity of hyperparathyroidism and hypervitaminosis,[28] could be accounted for as readily at least, we would suggest, by regarding them as a necessary feature of the hypercalcæmia per se, brought on independently by the two disorders.

REMARKS ON THE CLINICAL USE OF PARATHORMONE.

In infantile (nutritional) tetany, osteomalacia, and juvenile rickets, as well as in rickets proper, the fundamental underlying error is the inadequate net absorption of Ca and/or P, resulting in an inadequate retention of Ca and/or P by the body as a whole. The logical therapeutic or prophylactic measure is the administration of vitamin D to correct that error. It may be conceded that as an emergency measure in tetany the use of parathormone is admissible, to bring about a rapid cure of the hypocalcæmia; but its continued use, in any of the above-mentioned conditions at least, is, we wish to suggest, to be deprecated, since it tends merely to aggravate the underlying error by diminishing still further the inadequate retention of calcium and withdrawing still more mineral from the impoverished bone. That parathormone has proved invaluable after parathyroidectomy of course needs no emphasising, but unfortunately there appears to be a tendency in some quarters to prescribe it, rather than vitamin D, whenever a calcium deficiency is suspected, and in fact certain parathyroid preparations are still advocated for rickets, nutritional tetany, and "disorders of calcium metabolism" generally.††

†† A clinical trial of parathyroid extracts in six cases of rickets, two of them with tetany, by Hoag and his collaborators,[29] resulted in the rather unsatisfying conclusion that "the reaction of individual patients . . . varies tremendously" and that "the influence of the extracts on the balance of calcium was not found to be uniformly unfavourable." An examination of their figures for the fæcal calcium, however, lends support to the contention that parathormone has either an adverse or else negligible effect on the net absorption.

Clinical Hypervitaminosis.

The value of irradiated ergosterol has been so fully demonstrated in clinical practice that one wishes to say nothing that might have the altogether undesired effect of discouraging its use. According to the records of a host of observers in all parts of the world—e.g., Wilkes,[30] May,[31] J. H. Hess,[32] and Alfred Hess,[33] and their respective co-workers in America, Aiden,[34] Cowell,[35] and others in England, Wiskott,[36] Aengenendt,[37] and many others in Germany, Schippers [38] in Holland, &c.—irradiated ergosterol has proved itself literally an infallible specific in the prevention or cure of rickets, if given in adequate doses. A main advantage is that it can readily be administered at much higher levels of vitamin D activity than is possible with cod-liver oil; it is well known that the latter may occasionally prove barely adequate for complete protection, particularly so with twins and premature infants. The practical significance of these considerations is seen to be very great; one has only to recall that, according to recent official statistics,[39] close on 87 per cent. of London elementary school-children gave evidence of having had "some degree of rickets," and that to-day "no child need have rickets." We wish then only to draw attention to the point that the human "optimum therapeutic dose" appears to be not far removed from the toxic overdose, and therefore that it is advisable to adhere closely to the correct dosage. We have been subject to some misquotation in this connexion. It is correct to say that we found the toxic overdose for the rat to be no less than 100,000 times the minimal effective dose, but from the outset we made it clear that the toxic overdose varied in different species, being for the human, according to the clinical evidence then available, not far removed from the optimal therapeutic dose (not the same, be it noted also, as the minimal dose).[40 41] We suggested that our experimental results "should not in any way discourage the rational use of the properly standardised material at the ascertainable correct physiological level," but we by no means excluded the possibility of hypervitaminosis in humans if such precautions were not taken, and indeed we emphasised the necessity for further standardisation.[42 40] In a later publication we have drawn attention to more recent clinical literature which we believe definitely indicates that the ill-effects produced in man by overdoses of irradiated ergosterol correspond in detail with those seen in experimental animals. The clinical instances in question are given below to illustrate (1) the proximity of optimal dose to toxic overdose, and (2) the identity of the clinical symptoms of excess with those produced experimentally in hypervitaminosis.

A satisfactory prophylactic dose, judging from the clinical data of György,[43] Hess, Lewis, and Rivkin,[44] Sobel and Claman,[45] and others is 0·5 mg. of irradiated ergosterol, or more precisely expressed about 5000 units of vitamin D (equivalent to about seven teaspoonfuls of cod-liver oil). It is probable that the dosage at first recommended tends to be on the low side: thus Alfred Hess advocated a standard dose of 10 drops per day of "100 D" ‡‡ for the first year of life, but later it was found advisable to increase the dose to about 20 or even 30 drops.[32 46] At the higher level no single case of rickets appeared (see Table).

For curative treatment J. H. Hess,[33] after considerable clinical experience, advocated a dosage of

‡‡ Official American preparation with 100 times the antirachitic activity of "good cod-liver oil."

10 to 15 drops per day of 100 D for mild rickets and 30 drops for severe rickets; no ill-effects suggestive of overdose were seen after 6 to 8 months' administration at this and higher levels. (Hypervitaminosis seems less liable to result in therapeutic than prophylactic treatment.) György, of Heidelberg, at first recommended 2 to 3 mg. of irradiated ergosterol for severe cases of rickets; later, after further clinical experience, the dose was reduced to 1 mg. per day (György [43]). Sobel and Claman [45] suggest as optimal therapeutic doses: for children under 1 year of age, 1 to 2 mg. per day, in divided doses; for children over 1 year, 3 to 4 mg. Hess, Lewis, and Rivkin [44] found 1 mg. to be the adequate dose for an average case of rickets.

Table showing Relative Value of Various Antirachitic Prophylactic Measures, from Data of J. H. Hess, Poncher, Dale, and Klein.[32]

No. of infants.	Treatment.	Result after 5–8 months' treatment.	
		Cases of severe rickets.	Cases of "slight" rickets.
63	Viosterol 100 D, 10–20 drops per day	0	0
6	Viosterol 100 D, 10 drops or less per day	0	6
44	Cod-liver oil, 1–3 teaspoons to 2 tablespoons per day	2	4
34	Controls, no treatment	9	10

Giving 2·5 to 5 mg. of irradiated ergosterol the last-mentioned authors encountered what appear to constitute the first recorded cases of clinical hypervitaminosis. The abnormalities observed included: three cases of hyperphosphatæmia (without apparent ill-effects), several cases of excessively calcified bone and of hypercalcæmia, two of the latter manifesting untoward clinical disturbances. György at Heidelberg relates a similar experience using doses around 4 mg. of irradiated ergosterol. A single case of calcification in the kidney with fatal termination, apparently due to hypervitaminosis, was seen by Putscher (1929 [47]); three instances of renal lesions after vigantol (Klaussner-Crohein, 1930 [48]); renal damage after three teaspoonfuls of vigantol taken in error during one day (Tu-Tungi, 1931 [49]); raised blood Ca or P in normal children or adults given 5 to 10 mg. (Hughes et al., 1929 [50]; Lasch, 1928 [51]; Ghirardi, 1929 [52]); and loss of Ca by way of the urine in normal children given very large overdoses (Hottinger, 1929 [53]). A recent fatal case is that recorded by Thatcher [54] at Edinburgh, who described typical calcareous deposits in the kidney.

In the foregoing clinical instances we see all the most characteristic signs of experimental hypervitaminosis, including the hypercalcæmia and/or hyperphosphatæmia, the overcalcified bone, the excessive urinary excretion of Ca and/or P (with renal damage), first described in this laboratory. In conclusion one may note, perhaps not without relief, that (as also in experimental animals) the ill-effects disappear rapidly, leaving no permanent injury if the excess of irradiated ergosterol is discontinued with no undue delay. From a practical standpoint hypervitaminosis D is almost impossible of production on natural foodstuffs, all of which in comparison are relatively inert. (As many as 14 teaspoonfuls of cod-liver oil per infant per day would be needed to give the same approximate antirachitic potency as the therapeutic optimum of 1 mg. of irradiated ergosterol.) Cod-liver oil in very large excess can, it is true, give rise in experimental animals to certain ill-effects of its own, which are quite distinct from those of hypervitaminosis D (Harris and Moore,[42 55] Norris and Church [56]); and it has been suggested that infants can suffer in the same way (Agduhr [57]). Recently we have discovered that if cod-liver oil be oxidised by aeration such toxicity is vastly increased (Harris [58]).

Summary.

1. Investigations on hypervitaminosis have substantiated the theory that the characteristic mode of action of vitamin D is to permit an increased "net absorption" ‖ ‖ of Ca and/or phosphate from the gut, tending to raise the level of the blood calcium and/or phosphate: the latter rise automatically brings about increased calcification in sites provided with the "bone," or "calcifying" enzyme, phosphatase. This action is apparent whether the vitamin is fed in suboptimal amounts, in doses approaching the optimum, or in moderate excess. Hypervitaminosis thus stands in logical contrast with rickets (hypo- or a-vitaminosis). In the latter there is deficient net absorption of calcium and/or phosphate, hence hypocalcæmia and/or hypophosphatæmia, and resulting insufficient calcification; while in hypervitaminosis there is a potential increase in net absorption, hypercalcæmia and/or hyperphosphatæmia, and excessive calcification in sites such as the growing end of the bone, in teeth, &c., and also in certain soft tissues such as the kidney and aorta, which are also richly provided with the "bone" enzyme.

2. The foregoing theory of vitamin D action permits a ready explanation of the following: the variation between species, in measures needed to induce rickets—e.g., rat compared with dog or human; the ætiology of experimental nutritional tetany compared with low-phosphate rickets; the influence in hyper- and hypo-vitaminosis of the Ca intake, Ca—P ratio, &c.

3. Like vitamin D the parathyroid hormone can also raise the level of the blood Ca, but the available evidence suggests that it does so solely by draining the mineral matter from the bone, and there are no records of increased net absorption from the gut. Until evidence is offered of the latter characteristic action, the theory cannot be accepted that vitamin D acts normally by simple stimulation of the parathyroid. Parathormone has been shown by past workers to bring about a loss of calcium to the body owing to the increased urinary excretion; the vitamin, on the other hand, in amounts up to moderate overdoses, tends to augment "retention" (the potential increase in net absorption exceeding any increase in urinary excretion). It is suggested that such symptoms as the increased urinary excretion and calcareous deposition common to both hypervitaminosis and hyperparathyroidism do not necessarily indicate stimulation of parathyroids by vitamin D excess, but may be attributed to the hypercalcæmia and/or hyperphosphatæmia to which both conditions independently give rise.

4. The indiscriminate use of parathormone clinically for cases of suspected calcium deficiency is to be deprecated, most definitely in such conditions as

‖ ‖ An increase in "net absorption" implies an *increase* in the gross amount absorbed from the gut or a *decrease* in the amount excreted back into the gut—i.e., of material previously absorbed.

infantile tetany, osteomalacia, late rickets, &c.; for although it will succeed in raising a low blood calcium, it merely aggravates the underlying metabolic error (inadequate retention of Ca and/or P), causing loss of minerals to the body, and still further depleting the already impoverished bones. Vitamin D, on the contrary, rectifies hypocalcæmia (or hypophosphatæmia) by ensuring an adequate utilisation of the food Ca (and/or P).

5. Complicating secondary effects occur in experimental hypervitaminosis when the maximal levels of toxicity are reached and have led to some misunderstanding. Loss of appetite and failure in gut function results in little calcium being absorbed (the absorption fails equally in partially starved controls having no excess of vitamin D), and since urinary excretion remains high the retention by the animal as a whole now tends to drop. Again, if maximal toxic doses of vitamin D are given, under these circumstances and particularly if the calcium intake is not correspondingly increased, secondary resorptive changes are seen in the bones, which can therefore provide an alternative source of some of the extra Ca drawn into the blood.

6. The ill-effects in hypervitaminosis are the same in man as in experimental animals. Clinical experience shows that for the human the toxic overdose of irradiated ergosterol is not far removed from the optimal (not "minimal") curative dose. The correct dosage should therefore be strictly adhered to.

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THE TREATMENT OF
INFECTIONS OF THE URINARY TRACT BY A KETOGENIC DIET.

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IN October, 1931, Dr. H. F. Helmholz and Dr. A. L. Clark presented to the staff of the Mayo Clinic the results of work which they had been doing quite independently on the effects of a ketogenic diet upon infections of the urinary tract.[1] Dr. Helmholz, working entirely with children, had been attracted to this study by the observation that the urine of children under treatment by a ketogenic diet for epilepsy was extraordinarily resistant to putrefaction. Dr. Clark undertook his investigations on account of the observations made by W. M. Clark[2] in 1915, which appeared to show that colon bacilli are inhibited from growing in urine at a pH of 4·6 to 5·0 on the acid side, and 9·2 to 9·6 on the alkaline side. It is interesting to note that each of these two observers carried out his experiments without the knowledge that the other was also working on the problem. Dr. Helmholz had previously studied the effect of acidification of the urine by means of ammonium and calcium chloride, producing a reaction with a pH of about 5·0, and had observed that this measure would accomplish the sterilisation of the urine in some cases but not in others. His experience, in common with that of many other observers, had been to the effect that while it was generally possible to sterilise the urine of children by the use of drugs in the absence of obstructive lesions, in the presence of such lesions—for instance, various types of hydronephrosis—sterilisation could not be obtained. He had in his care a child of 8 with a chronic infection of the urinary tract and marked hydronephrosis on the left side; he found that it was impossible to sterilise the urine by the use of various drugs, including ammonium chloride. When a ketogenic diet, producing an acidity of 5·5, was given, sterilisation of the urine was obtained. He also observed on this patient that after the diet had been discontinued and the urine returned to an acidity of only 6·4, it nevertheless remained sterile.

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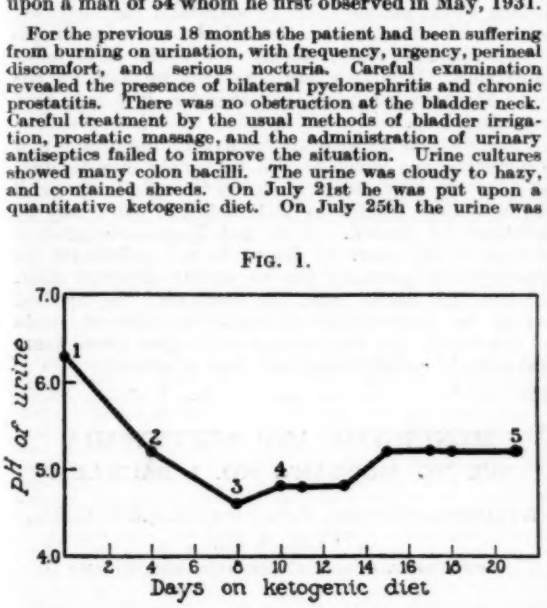
His next trial of the method was made upon a child of 9, who was known to have had a chronic urinary tract infection for three years, accompanied by recurrent attacks of fever and renal pain. Examination showed an albuminuria of grade 2 and a pyuria of grade 4 (these grades being on a scale of 4). Cultures from the bladder and ureters showed innumerable colonies of *Streptococcus hæmolyticus*. Further examination disclosed a diffused cystitis, bilateral pyelonephritis, bilateral hydronephrosis and hydro-ureter, with probable duplication of the ureter on the left side. This patient reacted in a manner similar to that of the other: by treatment with drugs it was not possible to sterilise the urine, but on the third day after the commencement of a ketogenic diet, with an acidity of 5·8, the urine was sterile. These observations have been followed by others giving similar results.

Dr. Clark, on the other hand, was working only with adult patients, and had been striving with the usual unsatisfactory results to sterilise the urine by the use of drugs. His first observation was made upon a man of 54 whom he first observed in May, 1931.

For the previous 18 months the patient had been suffering from burning on urination, with frequency, urgency, perineal discomfort, and serious nocturia. Careful examination revealed the presence of bilateral pyelonephritis and chronic prostatitis. There was no obstruction at the bladder neck. Careful treatment by the usual methods of bladder irrigation, prostatic massage, and the administration of urinary antiseptics failed to improve the situation. Urine cultures showed many colon bacilli. The urine was cloudy to hazy, and contained shreds. On July 21st he was put upon a quantitative ketogenic diet. On July 25th the urine was

FIG. 1.



Case 1.—Features corresponding with the numerals on the graph are as follows: 1, both glasses of urine in the two glass test cloudy, urination at night three to four times, frequency and urgency, many bacilli in sediment; 2, symptoms improved, glass 1 slight haze, glass 2 clear; 3, no frequency, no nocturia, occasional bacillus in sediment, urine clear; 4 and 5 no growth on culture.

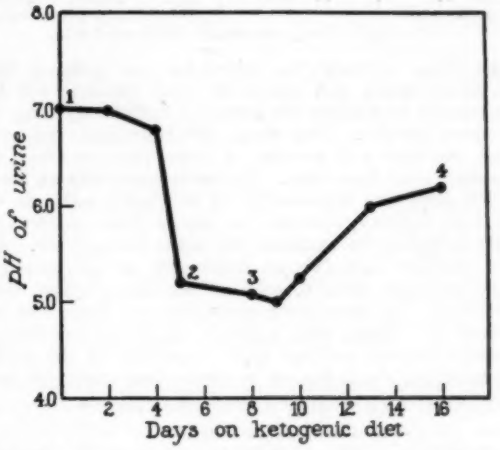
clear and showed an acidity of 5·2. The symptoms were also markedly improved. On July 29th both glasses of urine remained clear; the acidity was 4·5 and the urine was sterile to culture. By this time irritation, frequency, and nocturia had disappeared. Fig. 1 shows the reaction of the urine in this case under treatment. On August 10th the patient was dismissed from the clinic and advised to continue a qualitative ketogenic diet at home. On August 24th he was re-examined: the urine was found to have remained clear and sterile, and showed a reaction of 4·8.

A second case was that of a man of 63, who came under observation on August 11th, 1931.

In the previous May he had developed serious nocturia, with urgency and perineal discomfort. From May 1st to August 1st various drugs and methods of local treatment had been tried but without benefit. The urine showed a very free growth of colon bacilli. On August 24th the patient was given a ketogenic diet; the reaction of the urine is shown in Fig. 2. On August 29th the urine was clear; cultures were free from colon bacilli but yielded a few colonies of *Aerobacter aerogenes*. On Sept. 1st the urine was entirely sterile, and remained so during the next ten days.

These cases under the care of Helmholz and Clark appeared to point to a very important effect produced upon urinary tract infections through increasing the acidity of the urine by a ketogenic diet. They served

FIG. 2.



Case 2.—Features corresponding with the numerals on the graph are as follows: 1, urine cloudy, urination at night two to three times, frequency, urgency, dysuria; 2, urine clear, Escherichia coli in culture, symptoms greatly relieved: 3, no growth on culture; and 4, still no growth on culture although pH was up to 6·2, no nocturia, frequency, or urgency.

to stimulate our interest in this method of treatment, and have been followed by a number of further observations with similar results. It will be noted that the effect upon the bacteria in the urine is not produced simply by the acidity; neither Helmholz nor Clark, working respectively with children and with adults and producing an acidity of about 5 by means of drugs, could sterilise the urine. On the other hand, an acidity of even lesser amount produced by a ketogenic diet was promptly effective. It appears, therefore, to follow that the acidity produced by diet has a very much more powerful sterilising effect than that produced by drugs. There is at least a strong suggestion that a ketogenic diet, operating not only through the urine, but—quite obviously—through the blood stream, will produce an effect upon the cells themselves, and will act at a much deeper level than where dependence is placed upon the contact of an acid urine with the superficial tissues.

It is practically interesting to consider what apparently objectionable effects this treatment may have. We have all in the past been familiar with the serious conditions found in children in the presence of marked ketosis, resulting either from starvation alone or from starvation associated with disease. There is at least a strong suggestion that the ketosis intentionally produced by diet is in some respects different from that seen in disease, and that the classical picture of ketosis does not result; further, that the bodies producing this reaction in the urine may not be precisely similar when liberated by these two different methods. Consequently, much further work in the chemistry of the urine under these conditions is indicated.

DETAILS OF THE DIET.

The following are details of a qualitative ketogenic diet giving approximately 2500 calories per day :—

Carbohydrate ..	20 grammes	Protein ..	70 grammes
Fat	240 grammes		

Food allowance for 1 day.

Butter, 10 squares ..	1/5 lb.	Soya bean muffins, 3.	
Cream, heavy whipping	1/4 pint	5 per cent. vegetables, 4 servings; 2 cups, such as spinach, asparagus, tomato, celery, lettuce, and cucumber.	
Bacon	4 strips		
Eggs	2		
Meat	4 oz.		

Tea and coffee, sweetened with saccharin.

This diet is probably one which for most patients will be disagreeable, and which for some patients will be impossible to enforce for a period sufficiently long to produce results. The work of Helmholz suggests that the diet will produce a more prompt effect in children than in adults. In the latter group at least seven days was required in 15 of Clark's patients to produce sterility, while in one case as much as 35 days were required to sterilise the urine completely. In yet another case it was impossible to produce an acidity lower than 6, and no sterilising effect was obtained. In three more cases the diet could not be tolerated. There thus appears to be an important personal factor, perhaps more important in the adult than in the child, but it is clear that many further observations upon this point will be required.

CONCLUSIONS.

Clark,[3] in a personal communication in March, 1932, draws the following conclusions :—

1. "The general condition of the patient must be such that he can endure the alteration in his diet. A patient who is able to take a moderate amount of exercise is a far more satisfactory subject for this type of treatment that one who is necessarily confined to bed.

2. "Coöperation of the patient is absolutely necessary. In Cases 2 and 6 the patients were not coöperative, and the results obtained, as judged by the pH of the urine, were correspondingly disappointing.

3. "The patient must be able to digest and assimilate fats. This was very clearly demonstrated in Case 15; the patient apparently was unable to prepare the ingested fats for assimilation. He had undergone resection of the stomach, but whether this fact is relevant to his inability to rid himself of bacilluria cannot be stated.

4. "The normal intake of fluid should be maintained. Increase in the intake of fluids may cause undesirable dilution of ketogenic products.

5. "If the infection is in the upper part of the urinary tract, treatment must be continued for a longer time than if the infection is in the bladder.

6. "The ketogenic diet tends to entail constipation and gastro-intestinal upsets, but a dietitian can forestall these effects."

This brief survey of the work of Helmholz and Clark appears to me to warrant the following tentative conclusions: (*a*) Acidity produced by a ketogenic diet is more effective than an equal acidity produced by drugs. (*b*) Acidity does not cause bladder irritation, as has been assumed in the past; on the contrary, irritation existing in the presence of urinary infection will be relieved by increasing the acidity of the urine at least to the extent that the infection is favourably influenced. (*c*) This method opens up an interesting field for further investigation, and may importantly affect the results of operations upon the urinary tract undertaken in the presence of previous chronic infection. Thus, we have hesitated to operate upon patients with infected hydronephrosis, and when we have done so some of them have shown violent increase of infection with serious consequences. If, as a result of this method of treatment, the infection in these kidneys can be controlled before operation, then the result of the operation, both as regards risk and permanency, is likely to be very much improved.

An interesting speculation in which one might indulge is on the effect of such treatment in preparing patients with prostatic obstruction for operation. Undoubtedly the largest single factor in the mortality of such operations, and also in the morbidity which follows successful intervention, is our inability to deal satisfactorily with existing infection. If it should prove possible to diminish or to abolish infection before operation, a very important improvement in our results would accrue. It is just conceivable that we might be able to produce before operation a certain protective mechanism in the tissues themselves which would enable them to withstand the increased chance of infection, whether of the lower or of the upper urinary tract, during the early days after operation. It is precisely here that we have in the past been most helpless, and therefore it is here that we need help.

The method appears to me a very important and interesting one which should be widely investigated, so that the suggestions made on the relatively small series of cases treated by Helmholz and Clark may be affirmed or denied. It is not impossible that a ketogenic diet may be found to act differently on peoples who normally live on widely different diets. Should this prove true, the results of the method might be importantly different in different parts of the world, and the method might thus prove more valuable in certain countries than in others.

[3] Clark, A. L.: Personal communication, March, 1932.

MENINGITIS AND SEPTICÆMIA DUE TO MORGAN'S NO. 1 BACILLUS.

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INFECTIONS of the blood with Morgan's No. 1 bacillus are rare, and infection of the meninges with this organism must be extremely uncommon, since we have not been able to find a reported case. The presence at the same time of two cases in the Birmingham Children's Hospital—one of septicæmia and the other of meningitis—presented an opportunity for their investigation and comparison. These children came from different places, some miles apart, and had at no time been exposed in any way to a common source of infection.

CASE 1.—A boy, aged 1½ years, sent in by Dr. F. M. Rowland, of Lichfield, was admitted on June 26th, 1931. He had been well until the 22nd, when he became restless. The following day he was drowsy and irritable; he also developed dirty habits, from which he had previously been free. During the day of June 26th he became worse and cried out without reason.

On admission he was drowsy and very ill. He was flushed, his temperature was 100° F., his pulse-rate was

140, and his respiration-rate 25 per minute. Examination of the central nervous system revealed bilateral ptosis, but no squint or other affection of the cranial nerves. Neck rigidity was fairly marked and Kernig's sign was positive on both sides of the body. The knee-jerks were both brisk and the plantar responses doubtfully flexor in type. No abnormalities were present in the chest or abdomen. The urine was normal. The ear-drums were normal on both sides.

Lumbar puncture revealed turbid cerebro-spinal fluid under increased pressure. On analysis it showed: cells, 1000 per c.mm., 75 per cent. polymorphonuclear in type; chlorides, 672 mg. per cent.; protein present in large quantity; sugar much reduced in quantity (the fluid had, however, been standing for 12 hours). On culture a Gram-negative bacillus was isolated.

The child became more and more comatose and emaciation became marked. The rigidity of the neck and limbs steadily increased until death, which took place nine days after admission. During this time his temperature swung from 97° to 99·6° F., rising above this only for a few hours before death. The pulse-rate remained constantly between 140 and 160 until the day before death, when it dropped to 108; on the day of decease it rose rapidly and became uncountable. The respiration-rate was 30–40 during the whole period. The bowels were constipated and enemata were required for their relief on occasion.

Lumbar puncture was performed daily. For the first six days after admission the fluid was turbid and under increased pressure. From this time until death it became so thick as to flow through the needle only in small amount and very slowly. Four days before death he developed a severe conjunctivitis, and in the evening he had a convulsion. From this time until his end he became more rigid and opisthotonic. The cerebro-spinal fluid was by now very thick and obtained in too small quantity to permit analysis. He died on July 5th, nine days after admission. No autopsy was allowed.

CASE 2.—A boy of 8, sent in by Dr. C. W. Coulter, was admitted on July 4th, 1931, with a history that two days before he had been seized with severe headache and vomiting. That night he had been delirious, and on the following day the headache and vomiting had continued. He was again delirious at night, but the following day, the day of his admission, he had stopped vomiting, though the headache had continued. He had also developed some pain in the right side. His bowels had been opened each day with a normal result.

On admission he was flushed, feverish, and irritable, the temperature was 102·8° F., the pulse-rate 120, and the respiration-rate 40. The tongue was furred, and there was slight stiffness of the neck and legs, but no other abnormality of the central nervous system. No abnormality was found in the cardiovascular system or abdomen, but there was a slight bronchitis. No rash was present; the ear-drums were both normal. Lumbar puncture was performed, the fluid obtained being clear and under increased pressure. The urine was normal. A provisional diagnosis of typhoid fever was made and a blood culture immediately performed, which yielded a Gram-negative bacillus.

On the day after admission his condition was unchanged; he had been slightly delirious over-night, but was now rational. The spleen was just palpable; it had not been felt on admission. His temperature had dropped to 100° F., and his pulse-rate to 90. On the following day he had improved markedly. His temperature was normal, his pulse-rate 88, and, beyond a slight cough, he was comfortable. From this point his recovery was rapid; the spleen was not again felt, the cough improved, and the last signs to go were the slight rigidity of the neck and legs. His bowels were very constipated, and for over a fortnight he required enemata to obtain an evacuation. His pulse-rate and temperature remained normal, and he was discharged cured on July 24th, 20 days after admission. His treatment for the first four days, until the diagnosis was finally established, was that usually prescribed for typhoid fever. After this a light varied diet was given, no other therapeutic measures being employed.

PATHOLOGY.

The cytological examination of the cerebro-spinal fluid from Case 1 showed a very high content of polymorphonuclear cells, indicating a septic type of meningitis. In the first specimen of cerebro-spinal fluid withdrawn dried smears revealed a Gram-negative bacillus of coliform appearance present in small numbers. Some forms were in pairs, but morphologically tended to be diplobacillary rather than diplococcal. Cultures on blood and trypsin-agar were sterile at this stage. Much protein was present in the form of globulin and albumin. The chloride content was very slightly reduced—viz., 672 mg. per 100 c.cm. On June 29th the sugar content was reduced to zero. The accompanying table summarises the changes found in the cerebro-spinal fluid:—

Date in 1931.	Cells.	Polymorphs (per cent.).	Dried smears.	Chlorides (mg. per cent.).	Sugar.	Albumin.	Globulin.	Cultures.
June 27	1000	75	Few G.-n. bac.	672	..	+ + +	+ + +	Sterile.
29	..	..	..	622	0	+ +	+	—
July 1	1330	70	Many G.-n. bac.	669	17	+ +	+	Blood-agar: sterile. Broth: G.-n. bacillus.
2	..	..	..	657	11	+ +	+	Blood-agar: coliform colonies.
3	700	90	G.-n. bac.	..	..	..	..	Serum water: G.-n. bacillus.

G.-n. bac. = Gram-negative bacilli.

Subculture of colonies on blood-agar, which at an early stage were more or less "pin-point" in appearance, yielded on MacConkey's medium a pure non-lactose fermenting growth. The fermentation reactions of this organism, which was a Gram-negative motile bacillus, were as follows:—

Lactose	Alkaline.	Milk	Alkaline.
Glucose	Acid and gas.	Gelatin	No liquefaction.
Mannite	Alkaline.	Indol	+
Dulcite	„	Voges-Proskauer	—
Saccharose	„		

These reactions were unchanged after 12 days, and are characteristic of Morgan's No. 1 bacillus. As agglutinating serum for Morgan's bacillus was not readily available, the organism was submitted to Prof. C. J. Lewis and Dr. Bayliss Ash, of the University of Birmingham, who were kind enough to send the following report:—

"The organism was compared with our standard Morgan's bacillus No. 1 with regard to cultural characteristics, fermentation reactions, and agglutination against a Morgan antiserum prepared in the laboratory. This organism was agglutinated at a titre of 1–900, and it agrees in all characteristics with our stock Morgan's bacillus."

It should be noted that in this form of meningitis the chloride content was slightly, but definitely, below normal; the average content of the four estimations made was 655 mg. per 100 c.cm. Neale and Esslemont [1] found that 730 mg. was the average amount in children from whom cerebro-spinal fluid was withdrawn but who proved to be non-meningitic, while cases of tuberculous meningitis averaged 613 mg. The sugar content was very definitely diminished, and its behaviour is apparently similar to that in other cases of septic meningitis—e.g., meningococcal and pneumococcal.

In Case 2 a Gram-negative bacillus was isolated from the blood on July 4th. This gave the fermentation reaction characteristic of Morgan's No. 1 bacillus, exactly as in Case 1. The sugars were left for 12 days and showed no change. Prof. Lewis and Dr. Ash kindly tested the organism for agglutination powers and reported: "The organism agrees similarly and is agglutinated by the Morgan antiserum to a titre of 1–1200."

An anomalous feature of this case was the isolation, from the cerebro-spinal fluid on July 4th, of a Gram-negative bacillus in broth, which, on subculture on MacConkey's medium, yielded lactose-fermenting colonies. As this fluid when taken on admission showed no cytological changes suggestive of meningitis, and as the nature of the illness (later proved to be a Morgan's septicæmia) was not then appreciated, this organism of apparently coliform type was regarded as an inadvertent contamination and was not further investigated. In the light of the subsequent results of subculture of the organism from the blood, it is possible, if not probable, that an error of observation regarding the lactose-fermenting capacity of the cerebro-spinal fluid organism was made, and that this too was in fact Morgan's No. 1 bacillus. It is interesting to note that on the fifteenth day of the illness the serum did not agglutinate the Morgan's No. 1 bacillus isolated; this contrasts with typhoid infections, in which a positive Widal test may be expected any time after the seventh day. As the child recovered, no further pathological investigations were made.

DISCUSSION.

We have not been able to trace any definite record of meningitis caused by Morgan's No. 1 bacillus. Cases of septicæmia are known to occur. Dick and Williams [3] have reported on an epidemic which was attributed on rather doubtful grounds to Morgan's bacillus. One case, on which no bacteriological examination was made, developed meningitis. Symmers and Wilson [3] report three cases of meningitis due to anthrax, typhoid, and Gaertner's bacillus. The last occurred in a child 4 months old, with an onset of vomiting and diarrhœa, and later typical signs of meningitis. Twice during life and at post-mortem examination they cultivated from the cerebro-spinal fluid an organism proving, by fermentation and agglutination absorption experiments, to be the bacillus of Gaertner. The intestine showed no inflammation; the Peyer's patches were not swollen; the brain showed a fibrinous exudate at the base. Kortenhaus records septicæmia, caused by Morgan's bacillus, and other cases of septicæmia with meningitis by allied organisms as the ætiological agents have been reported—e.g., by Friedländer's bacillus,[4] by *B. acid. lact.* (in the new-born),[5] by the colon bacillus (Navarro [6] and Bardisian [7]), and by *B. paratyphosus* B (Anderson,[8] Brahdy [9]).

Both these cases were under the care of Prof. L. G. Parsons, who has kindly allowed us to report them, and to him we are very grateful. We would also thank Prof. Lewis and Dr. Ash for their kindness in reporting upon the organisms in both cases.

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QUEEN'S HOSPITAL FOR CHILDREN.—At the annual meeting last week the Duke of York, the president, announced that a fund is to be raised for building a new out-patient department to commemorate the generosity of the late Lady Cooper, vice-president, and to be named after her.

CEREBRO-SPINAL FLUID PRESSURES IN SYPHILIS.

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IT is generally stated in the text-books that one of the commonest and earliest signs of a pathological condition of the cerebro-spinal fluid in syphilis is an increased pressure; indeed, one seldom sees a report on a cerebro-spinal fluid examination in which it is not remarked that the tension was somewhat raised. Very often these observations are based upon a rough estimate of the number of drops which flow from the needle in a minute and, even where a manometer is used, there is such a lack of uniformity of technique that probably very few of the records can be accepted without question. The purpose of this paper is to give an account of the figures reported in the literature, to discuss the technique of manometry, and finally, to publish the results of observations upon the pressures obtaining in a series of some 300 cases of syphilis, in all stages of the disease.

The results of previous investigators may be shown conveniently in tabular form; it should be mentioned that these are the figures obtained by routine examinations of syphilitics in all stages of the disease without clinical signs of neurological abnormality.

Author.	Stage of disease.	Cases.	Percentage with hyper-tension.	Remarks.
Raynaud et al.[1]	Primary and secondary.	38	36	With Claude's manometer in sitting position.
	Tertiary.	24	37	—
Raynaud et al.[2]	Primary and secondary.	152	38·1	—
	Tertiary.	120	40	
Fleischmann [3]	Primary sero-negative.	27	51·8	Only 37·1 per cent. had pleocytosis.
	Primary sero-positive.	39	48·6	Pleocytosis in 33 per cent.
	Secondary.	135	68·8	Pleocytosis in 50·4 per cent.
	Tertiary.	31	87·5	Pleocytosis in 50 per cent.
Ravaut [4] ..	Secondary.	33	42	Pleocytosis in 88 per cent.
Werther [5] ..	,,	?	82	Pleocytosis in 48 per cent.
Eskuchen [3] ..	,,	?	60–85	—

According to Dujardin,[4] pleocytosis in the primary or secondary stage of the disease is always accompanied, and sometimes preceded, by increase of fluid pressure; and Greenfield and Carmichael [6] state that increase of cells in the fluid in tertiary syphilis is usually associated with an increase of pressure.

It will be seen shortly that the above figures are very greatly at variance from those now reported and I believe that the difference may be explained by a consideration of the many sources of error that present themselves. It will be readily admitted that the favourite bedside method of counting the number of drops that flow from the needle is apt to be grossly inaccurate; one frequently finds, when collecting fluid for examination, that a slight rotation of the needle about its long axis will immediately

treble the rate of flow, presumably because the orifice was occluded by some adjacent tissue.

APPARATUS AND TECHNIQUE.

There are various types of manometer on the market and probably the best are the simplest which consist of a glass tube of narrow bore, graduated in centimetres, which can readily be attached to the needle after withdrawal of the stilette.

The one I use is readily made from a piece of thermometer tubing, some 50 cm. in length, with a bore of 0·5 to 1 mm.; this is bent at a right angle 3 cm. from one end, in the flame of a burner, care being taken by blowing through it meanwhile that the lumen does not become occluded; the bent end may either be fused into a metal nozzle that will fit the lumbar puncture needle, or else attached to the nozzle by a short length of rubber pressure tubing. In graduating such a manometer it is necessary to make a correction for capillary attraction since zero does not coincide with the level of the needle; the lower end of the manometer is placed in a dish containing cerebro-spinal fluid (preferably a mixture from several patients) and, with the nozzle just below the level of the fluid, the latter will be seen to rise up the tube a distance of as much as 5 cm., the height varying according to the diameter of the tube; when the position of the meniscus is definitely ascertained this point is marked as zero, with a diamond pencil, and the tube graduated upwards from here.

Such a manometer may conveniently be sterilised before use by attaching a rubber teat to the upper end, immersing the lower end in a dish of spirit and drawing the spirit up the tube by compressing the teat; finally the spirit is expelled in like manner until it is dry.

For the purpose of manometric readings it is necessary that lumbar puncture be performed with the patient lying on his side; in the sitting position, as used by Raynaud, the pressure will be influenced by the length of the patient's back.

When the stilette is withdrawn from the needle and fluid begins to flow, the manometer is immediately attached; it is then essential that the patient's head should be on the same level as his spine and lying in a comfortable position; the legs should be extended slightly and the patient directed to lie perfectly still without straining. This is one of the most important points of the whole procedure and undoubtedly constitutes the largest source of error. One finds in almost every case that the fluid rises to a considerable height at first and only returns to its true level after the lapse of a few minutes; the fall is frequently accelerated if the patient is instructed to take a few long breaths, so as to relax the abdomen. It is well to slope the manometer a few times, thus allowing the fluid to run up nearly to the top, and observe whether it returns constantly to the same level. As a further precaution, lest the needle should be occluded, it is advisable to compress the jugular veins and so elicit the Queckenstedt phenomenon; this last provision has the added advantage of detecting spinal block or, as in one case recently seen by the writer, an unsuspected lateral sinus thrombosis. In infants or young children who cry it is quite useless to attempt to measure the pressure, and the same is true of lunatics or other persons who have to be restrained during the operation; the slightest exertion on the part of the patient is recorded by a rise in the pressure.

RESULTS OF EXAMINATION.

In the cases now to be reported the patients are all syphilitic natives of the Sudan; they include those attending local hospitals and also various native soldiers and prisoners whose bloods were found, on routine examination, to be sero-positive. This work is being done in a study of syphilis among the Sudanese, the results of which will be published at a later date. Complete examinations have now been made of 313 patients in various stages of the disease.

1. *Primary Cases*, with chancre but no secondary signs.—This group comprises 22 individuals, of whom 9 had increased cell counts (over 3 per c.mm. in Fuchs-Rosenthal's chamber) and/or a total protein of over 30 mg. per cent. (by Mestrezat's diaphanometric method). The average pressure in this group was 11 cm. of fluid and the extremes were 2 and 18; the fluid with the highest cell count (35½ per c.mm.) and a positive Pandy reaction had a pressure of 11 cm. of fluid.

2. *Secondary or Early Tertiary Cases*, with skin lesions.—There were 55 cases, of which 15 had positive changes in the cerebro-spinal fluid, as defined above. The average pressure was 9·9 cm. of fluid and the extremes 0 and 15. The case with zero pressure had 4½ cells per c.mm. and a protein content of 35 mg. per cent.; there can be no doubt as to the validity of this reading as compression of the jugular veins produced an immediate rise in the manometer tube and this fell promptly to the zero mark when pressure was released. Another patient in the group with 38½ cells, 50 mg. of protein, and a positive Pandy and +++ Kahn had a pressure of only 2 cm. of fluid; and one with 45 cells, 40 mg. protein and + Kahn had a pressure of 14 cm. of fluid.

3. *Tertiary Cases* with active cutaneous or visceral lesions.—There were 53 cases in this group and 23 had positive fluids. The average pressure was 10·7 cm. of fluid, with extremes of 0 and 26; the one with a pressure of 26 was a case of syphilitic carditis with extreme decompensation and ascites so that here the hypertension may well have been of purely mechanical origin. One with a pressure of 25 cm. was a man with extensive ulceration of the palate and a cerebro-spinal fluid containing 8½ cells and 45 mg. per cent. of protein, with + Kahn reaction. The next highest, with a pressure of 18 cm. of fluid, was a case of cirrhosis with ascites and an otherwise normal fluid. The remainder were all 16 cm. of fluid pressure, or less. A solitary case with zero pressure was a man with specific iritis whose fluid contained 40 mg. per cent. of protein and no cells in 3 c.mm. In this group, therefore, we can only cite one case, that with ulceration of the palate, as having hypertension of the cerebro-spinal fluid if we accept as our upper limit of normality a pressure of 20 cm. of fluid.

4. *Congenital Lesions.*—In only six cases in this group was it possible to take an accurate manometric reading; of these four had positive fluids. Only one, a boy with a criminal record, scarring of the tibiæ from old gummata and exaggerated tendon reflexes, had a pressure of 22 cm. of fluid; he had a protein of 45 mg. per cent. and 1½ cells. The remainder had pressures between 7 and 15; one, with a cell count of 168 per c.mm., protein 50 mg. per cent. Pandy +, Kahn +++ and a weak luetic Lange gold curve, had a pressure of 10 cm. of fluid.

5. *Latent Tertiary*, with no apparent lesions clinically.—Of 157 in this group 28 had positive fluids. The average pressure was 10 cm. of fluid and the extremes were 0 and 22. The one case with the pressure of 22 had Kahn + in his fluid but no other abnormality; this was the only one above 18. A patient with 424 cells, of which 4 per cent. were plasma cells and 1 per cent. polymorphonuclears, a protein of 60 mg. per cent., Pandy ++, Kahn +++ and a luetic gold curve, had a pressure of 15 cm. of fluid, and two others with 323 and 184 cells and other findings parallel had pressures of 11 and 12 cm. respectively. Two cases with zero pressure had normal fluids.

6. *Neurosyphilis and Retinitis.*—Twenty cases, with positive fluid in 13. This group had an average pressure of 11 cm. of fluid and extremes of 0 and 31. The group included the following: hemiplegia of probable syphilitic origin, 3 cases; cranial nerve palsies, 2; hemiplegic Jacksonian epilepsy, 1; choroiditis, 3; optic atrophy, 2; retrobulbar neuritis, 1; thrombosis of retinal artery, 1; transverse myelitis, 1; neuro-recurrence, with meningeal signs, 2; chronic syphilitic meningitis, 1; peripheral neuritis, 2; and one case with a history of maniacal outbursts, a positive fluid, but no sign of G.P.I. One of the neuro-recurrences had 1856 cells per c.mm., a protein content of 240 mg. per cent., positive Kahn, globulin and gold reactions, and a pressure of 31 cm. of fluid; this was the only one with a pressure over 16 cm. of fluid; the other neuro-recurrence, of lesser magnitude with 94 cells, had a pressure of 9 cm. of fluid.

DISCUSSION AND SUMMARY.

There is a lamentable lack of information in the literature about the actual degree of pressure that may be considered normal. Some of the authors whose figures are quoted at the beginning of this paper considered 20 cm. of fluid as the upper limit of normal,

but most are content with remarking that the pressure was raised. Samson Wright [6] gives as normal figures 6 to 12 cm. of water, Purves-Stewart [7] 10 to 15, and Stitt [8] 9·5 to 12 cm. of water. Collier and Adie [9] give no figures but say "normally the fluid escapes drop by drop. If it runs rapidly or spurts out, this is an indication of the increase of cerebro-spinal pressure." Brain and Strauss [10] are the only authorities among those now quoted who draw attention to the influence of a cramped posture upon the pressure reading; they consider the normal limits to be 10 to 20 cm. of fluid.

When there is so little agreement among those who take measurements, and when the rough impression of the rate of flow from the needle is so generally accepted as an adequate record, it is hardly surprising that loose statements are prevalent.

In the above series of 313 cases of syphilis, in which routine examinations of the cerebro-spinal fluid were made, hypertension was the least common abnormality and there was no apparent relation between the degree of pathological change and the pressure of the fluid. In this series there were 20 cases of clinical neurosyphilis and 92 had pathological fluids, but only five showed pressures in excess of 20 cm. of fluid, and one of these was certainly due to congestive heart failure. These figures contrast strikingly with those presented by other authors and are in entire disagreement with the constantly repeated text-book opinion that hypertension is one of the earliest signs of syphilitic involvement of the central nervous system.

It may be objected that for the method I used it is necessary to fix a lower limit for the normal pressure, but if one were to apply a figure of 15 cm. of fluid to the present series, there would still be no agreement whatever between the hypertension and degree of change as estimated by other means.

It should perhaps be mentioned that I have no experience, in this respect, of general paresis or tabes, for those affections appear not to exist among natives of the Sudan; and, further, this paper deals only with syphilis. It is not suggested that increased pressure is not a common or reliable sign in other inflammatory or neoplastic disorders of the central nervous system.

CONCLUSION.

There appears to be little evidence that increased cerebro-spinal fluid pressure is either a common or a reliable indication of syphilis of the nervous system and the constant quotation of this sign in the text-books is the result of inaccurate observation.

I am indebted to the physicians and surgeons of the Sudan Medical Service, more especially to Dr. R. M. Humphreys and Mr. C. Grantham Hill, of Khartoum Civil Hospital, for access to cases under their charge.

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Clinical and Laboratory Notes

A CASE OF PURPURA RHEUMATICA.

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THE importance of a primary septic focus in cases showing the hæmorrhagic diathesis is still a matter of dispute. Ledingham [1] produced typical purpura hæmorrhagica in animals by injecting anti-platelet serum. Frank [2] and Kaznelson [3] considered the reduction of platelets in purpura to be the immediate cause of the purpuric manifestations. The former regarded the thrombopenia to be due to an aplastic state of the bone-marrow, caused by a toxic body in the spleen. Bedson,[4] however, as the result of work on guinea-pigs, concluded that diminished platelets were not sufficient alone to cause a purpuric eruption, and that some damage to the endothelial lining of the capillaries was necessary in addition. Brill [5] also considered that a simple diminution in the number of platelets was insufficient to cause purpura, and suggested that another factor might be some unknown substance produced by the spleen and acting through the blood. Kidd [6] drew attention to the frequency of a local focus of infection in his series of 24 cases of purpura of the urinary tract and the subsequent improvement on removal of the focus. Subsequent authors have stressed the frequent presence of a septic focus in cases of purpura, while some have associated the disease with a vitamin deficiency of an unknown nature.

The following case of Schönlein's purpura (purpura rheumatica) supports the theory that there is often an infective process acting as a primary cause.

A boy, aged 12 years, was admitted to Harrogate General Hospital on Sept. 22nd, 1930, with a history of a purpuric eruption which had commenced four months previously. At the onset the right knee was reported as being swollen, hot, and tender, but the joint condition subsided entirely in about eight days. For two months his temperature had ranged from 99° to 102° F. Twelve months before admission the patient had an attack of rheumatic fever. There was no relevant family history.

On admission the temperature was 101° F., and pulse-rate 100. The fading purpuric spots were still evident on the forearms and legs. A curious feature was the presence on the upper and lower limbs of numerous hard subcutaneous nodules, each about the size of a hazel-nut. The tonsils were large and not above suspicion as foci of sepsis. A systolic murmur was audible at the mitral area. The spleen was not enlarged. One of the subcutaneous nodules mentioned above was removed, and microscopic examination showed a round-celled infiltration of the subcutaneous tissue, suggesting a low-grade infection. Large doses of salicylates were given and the temperature subsided within 48 hours. The patient made an uninterrupted recovery. The mitral systolic murmur disappeared, and the subcutaneous nodules resolved.

On Dec. 29th the boy had an ingrowing toe-nail removed under a general anæsthetic (ethyl chloride). On the next day his temperature rose to 102·4° F. Quite rapidly large and tender swellings appeared in the subcutaneous tissues in the region of the larger joints of the extremities, most evident at the knee- and elbow-joints. The overlying skin was unaffected. The knee- and elbow-joints were slightly swollen, tender and painful on movement, but there was no redness of the overlying skin. Salicylates were again administered in large doses, and although the temperature persisted, the subcutaneous and joint swellings subsided quickly. Hæmostyl was then administered. A course of 10 c.cm. intramuscularly daily for three days was given. The temperature quickly fell to normal.

[1] Ledingham, J. C. G.: THE LANCET, 1914, i., 1673.
[2] Frank: Berl. Klin. Woch., 1916, xxxvii., 2.
[3] Kaznelson, P.: Zeit. f. klin. Med., 1919, lxxxvii., 133.
[4] Bedson, S. P.: Jour. Path. and Bact., 1922, xxv., 94.
[5] Brill, N. E.: Internat. Clinics, 1924, 34. s., i., 32.
[6] Kidd, F.: Proc. Roy. Soc. Med., 1928, xxi., 19.

Fourteen days later the temperature rose to 102° F., and again quite suddenly appeared similar swellings in the subcutaneous tissues, one in the region of the left elbow and another in the left submaxillary region. Above the right knee in the line of the great saphenous vein was a hard deep-seated swelling which differed from the other swellings in the fact that it was larger, harder, more tender, and only very slowly resolved. The left elbow- and right knee-joints were swollen, tender, and painful on movement. The eyelids were swollen and the facial appearance was suggestive of nephritis, but there was no albuminuria. There were no hæmorrhages into the skin. Another course of hæmostyl injections was given. The joint condition quickly subsided, and the deep swellings, with the exception of the one above the right knee, very soon resolved. The temperature soon fell to normal. Forty-eight hours after the last injection of hæmostyl the patient developed œdema of both eyelids, but this readily subsided without treatment. This was undoubtedly an anaphylactic phenomenon.

During the next four weeks the patient's condition was satisfactory. Then he complained of pain in his right side and his temperature rose to 102·4° F., and pulse-rate 126. A pleural rub was audible on auscultation at the right base. A small effusion rapidly developed. On the next day purpuric spots appeared on the extremities, and also a few on the face and trunk. A systolic murmur was heard at the apex. Hæmostyl was again administered as before and the temperature fell gradually. The effusion quickly resolved. A general urticaria appeared after the last injection of hæmostyl. This was an anaphylactic phenomenon again. One c.cm. of pituitrin was given and the urticaria disappeared completely in a few hours. A week later the apical murmur was no longer heard.

Eleven weeks later the patient developed another attack of pyrexia associated with a deep-seated swelling in the region of the left elbow and another near the left knee. Once again these joints were swollen, stiff, and painful on movement. A course of three injections of hæmostyl brought back the temperature to normal five days after onset, and the deep subcutaneous swellings and joint swellings quickly subsided.

Two weeks later the tonsils were removed by dissection. There was no excessive bleeding at operation. The patient reported nine months after tonsillectomy and was found to be in very good health; there had been no further attack of purpura.

During these attacks the blood platelet count was normal, red cell count showed moderate anæmia, and white cell count slight leucocytosis which was polymorphonuclear in type. The bleeding time was much lengthened, and the red cell sedimentation was abnormally high. Typical readings during an attack were: platelets, 210,000 per c.mm.; red cells, 3,600,000; white cells, 12,800 per c.mm. (polymorphs, 87 per cent.). Bleeding time, 4 minutes; red cell sedimentation rate, 66 mm. at the end of one hour. Blood culture and urine were sterile during the attacks, and fæces contained no abnormal bacteria. During the intervals the bleeding time fell as low as 1 minute and the red cell sedimentation rate to 35 mm. per hour.

It is interesting to note that in only two of the five attacks did cutaneous hæmorrhages appear. This shows that it is by no means invariable for hæmorrhages to occur into the skin; and that it is possible to have damage to the capillary endothelium to a degree sufficient to allow of the passage of plasma only as the sole manifestation of the diathesis. One cannot be dogmatic on the exact nature of all the deep-seated swellings. Many of these, considering their relatively short duration, were most probably caused by exudation of serum alone. Others, and certainly the very hard, tender, and slowly resolving swelling on the right thigh which occurred in the second attack after admission, were most probably due to hæmorrhages.

It is difficult to explain the swinging temperatures accompanying each attack in any other way than by the presence of some infective condition, probably originating in the tonsils. The attack of pleurisy was considered to be an infective condition, and the simultaneous purpuric eruption is significant. The interesting subcutaneous nodules which were observed on admission, and which were found to be due to a low-grade infection of the subcutaneous tissues, tend to confirm the opinion that some infective condition was present, as does the presence of the polymorphonuclear leucocytosis. It is interesting to note the constant improvement resulting from the administration of hæmostyl.

I am indebted to Dr. C. W. Curtis Bain for permission to publish this case, and for his criticisms.

ACUTE OBSTRUCTION OF THE BOWEL PRESENT AT BIRTH.*

By Gavin Dunlop, M.B. Edin.,
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A PRIMIPARA had a fall when six months pregnant. The fall was followed by an illness lasting about a month, during which there was severe abdominal pain with vomiting. At this time she was not under my care. On recovery she went to term and was delivered. She was attended by a midwife who advised medical assistance to be sought since the child's abdomen was unusually prominent. The midwife declared that she delivered the head and shoulders without any difficulty, but that the perineum tore as the abdomen of the child passed the vulva.

A few hours after birth the child began to vomit meconium, later followed by quantities of bile-stained fluid. Both the breast and fluids by the mouth were refused and there was never any action of the bowels, although on rectal examination some sloughs were brought down on the finger. This made one suspect intussusception, but there was no straining, no passage of mucus, and no palpable tumour. The condition of the child at 2 days' old was so poor as to put operation out of the question, but he lingered on for a week, dying on the seventh day. Post mortem, the abdomen contained gas, but no free fluid. The intestines were everywhere matted together, but the adhesions were not of recent formation and were firm enough to tear the bowel when an attempt was made to separate them. The main obstruction was found in the proximal part of the jejunum, and was caused by kinking of the gut by a band of adhesion. Above the obstruction the bowel was much distended by gas and contained a small amount of bile-stained fluid, but below the stricture it was collapsed and empty. The bowel wall was congested in the upper part, but lower down it presented a normal appearance.

As regards ætiology, my theory is as follows: When the mother sustained her fall during the sixth month of her pregnancy she received a blow on the abdomen, and, as stated above, was confined to bed for a month with abdominal pain and vomiting. It would seem that this illness was an attack of peritonitis whose onset was determined by injury to and lowering of the vitality of her internal organs. If it may be assumed that the placenta either shared in the damage caused by the fall, or was injured by the ensuing infection, then one can believe that its natural protective influence was abolished and that bacteria gained entrance to the fœtal circulation by the blood stream. Unfortunately permission to examine was confined to the abdomen, so it is impossible to say whether there were other lesions to be found in the body of the child besides the signs of peritonitis. The midwife who attended at the birth did not examine the placenta with more than ordinary care, but her statement is that there was nothing unusual except the fact that it was of the battledore type.

* Read before the Royal Medical Society of Edinburgh.

MEDICAL SOCIETIES

WEST LONDON MEDICO-CHIRURGICAL SOCIETY.

AT a meeting of this society on May 4th, with Dr. H. H. MILLS, the President, in the chair, a discussion on

Excessive Surgery

was opened by Mr. HAMBLEN THOMAS, who declared his intention of being provocative. From the early days of history, he said, trephining of the skull had been performed to let out evil spirits; the Assyrians and the Egyptians had practised the operation. In ancient Greece medicine was held in great esteem. Surgery received a fresh stimulus in the sixteenth century from the study of anatomy, and during the seventeenth and eighteenth centuries the study of physiology had advanced. There was a time when the surgeons at some of the large hospitals called on the physicians every morning for orders. When antiseptics and anæsthetics came into use in the nineteenth century a wider range of operations became possible. Some degree of antagonism had existed between physicians and surgeons in the past, but good results were to be hoped from the collaboration of physicians and surgeons in the future, and the coöperation of the family doctor with the surgeon was especially valuable. All operations involved danger, if only from the anæsthetic, and he occasionally wondered whether certain operations were not too extensive. Simple amputation of the breast for carcinoma, to take an example, appeared to give results almost as good as the complete Halstead operation. Mutilated limbs could sometimes be saved from amputation if the vascular supply was good. The phrase "surgical interference" was commonly used, and if interference were carried to extremes every child would have its appendix removed to avoid the chance of appendicitis. Drastic surgery might sometimes be worse than the disease, as in resection of the colon, some cases of gastrectomy, and operations for carcinoma of the thoracic œsophagus. Tonsils were frequently removed from patients in whom nasal trouble had been overlooked. A time might come in the future when all disease would be cured or aborted by medical measures, and only orthopædic and repair work would be left for the surgeons.

A MUTUAL FIELD OF WORK.

Dr. GEOFFREY EVANS said that though there had been antagonism between physicians and surgeons in the past they now worked in collaboration, in London at least. Physicians, although lacking the surgeon's skill with special instruments, such as the cystoscope, were beginning to approach surgeons in their capacity to diagnose surgical conditions, and were supplying patients to the surgeons. Ignoring other aspects of surgery, he wished to consider that field in which physicians and surgeons were watching each other to decide which could do better for the patient. It was excessive surgery to open the thorax or the skull for exploratory purposes, unless the surgeon had some idea where to make the opening. With the abdomen it was less important to know where to make the opening than to have some idea of the nature of the disease. Bleeding from the bowel, for example, might come from an ulcer or a new growth, and operation might cure the patient; on the other hand, if the bleeding came from an arteriosclerotic vessel operation might kill him. Pain was among the causes of excessive surgery and a certain number of operations were performed for functional causes such as spastic colon, because of the pain of the patient and sometimes because of the anxiety of the relatives. Too many operations were performed for adhesions, a diagnosis which was accurate not more than once a year in any considerable practice. Operations were also performed to improve on nature, such as gastropexies and cæcopexies; nephropexy was occasionally advisable and curative, but 'pexy operations as a whole were too often followed by visceral sensations which, if noticed as a sequence to operation, were less amenable to treatment than if noticed before. Peptic ulcers were among conditions for which both medical and surgical treatment were available. A certain number of patients would die of peptic ulcer in any case, whatever treatment was employed. Hurst and Ryle obtained good results with medical treatment, and it was equally certain that the results of surgical treatment were good. If a patient survived two years after operation his expectation of life was probably better than it would have been without operation; but some failed to survive, and 15 to 20 per cent. were not improved by surgical treatment. In his opinion, if death from hæmorrhage or perforation was to be feared, operation should be advised; if not, the patient should be given medical treatment for two or three years, and, if this was not successful, operation could then be performed. In the case of certain organic diseases to which recognised symptoms were attributable, operation sometimes failed to relieve the patient; examples were chronic appendicitis, cholelithiasis, and tonsillitis. Removal of the gall-bladder in cases of cholecystitis might fail to remove the symptoms, and symptoms attributable to chronic tonsillitis were not necessarily due to infected tonsils. In an appreciable number of cases symptoms usually attributed to the respiratory tract were due to hyperchlorhydria. Faulty posture, atmosphere, and diet might all play a part in producing symptoms. Surgery, in his opinion, was not excessive at the present time, but he feared lest it should be in the future. The patient should be examined thoroughly by his doctor before being recommended for surgical treatment.

THE CHOICE OF THE PATIENT.

Mr. ZACHARY COPE said that physicians were of two kinds: those who were conservative and looked upon surgeons as their natural enemies, and those who inclined towards excessive surgery, and expected the surgeon to achieve the impossible. The patient could always refuse to have an operation, and it was no part of the surgeon's business to tell him he would die unless he submitted to it. The surgeon might be mistaken in his opinion; patients with symptoms of obstruction of the small intestine having refused operation and taken castor oil had recovered. Surgery should not be recommended merely because something abnormal was discovered, such as a lipoma which was occasioning the patient no discomfort. Every man over 50 or 60 had an enlarged prostate, but this did not require to be removed unless it was affecting the condition of the kidneys or interrupting his life in any way. Operation should not be performed for any condition amenable to medical treatment until medical treatment had been thoroughly tried. But in some cases operation might be hastened for economic reasons, for example, where a patient with gastric ulcer was likely to lose his job as a result of needing recurrent periods of medical treatment.

He considered that the duodenal tube might be used more freely by physicians in this country in the treatment of ulcer. The optimum time for operation should be chosen; diabetes and toxic goitre should be controlled before operation was undertaken. Gastric ulcer cases should be prepared for a few days and perhaps given a blood transfusion. Even a peritonitis case should be treated for a few hours to reduce shock and pain. Operation in a hospital or nursing home gave the patient a better chance of recovery than an operation in a private house. Assistants should be available, especially to give the most suitable type of anæsthetic. The mortality in the abdomino-perineal operation for carcinoma of the rectum had been greatly reduced by the use of gas and oxygen and spinal anæsthesia, and he preferred to wait until these were available before undertaking this operation. Every surgeon should consider his own limitations and avoid any operation which he did not feel he was capable of performing. To operate or not to operate was sometimes, for the patient, to be or not to be.

Mr. SANGSTER SIMMOND divided the profession into four classes: ultra-medical physicians; excessively surgical surgeons; surgically minded physicians; and medically minded surgeons. So little territory had been left unexplored in the surgical field that young surgeons were reduced to treating medical conditions surgically. The training of surgeons was limited to watertight compartments; few had any experience of general practice, although such experience would be valuable to them. The treatment proposed for gastric ulcer depended on whether the patient happened to be admitted to a medical or to a surgical ward. A borderline ward would be an advantage, under the joint control of physicians and surgeons, in order that they might collaborate on the treatment of the case.

Mr. NEIL SINCLAIR said that when a surgeon opened a patient's abdomen and found, say, gall-stones, some calcified glands, a gastric ulcer, and a chronic appendix, it required great restraint to be content with one major operation instead of four. Surgeons should not think of themselves as carpenters; they should keep in touch with medicine.

Dr. MAURICE SHAW thought that surgeons were sometimes lured into excessive surgery by the physicians. In a large proportion of cases in which laparotomy was performed for suspected carcinoma of the intestinal tract, nothing abnormal was found. Surgeons were apt to complain that physicians sent them cancer cases too late, but in doubtful cases it was sometimes difficult to persuade the surgeons to operate. They preferred a certainty. He thought there was a place for cholecystostomy in the treatment of an infected gall-bladder. It was often impossible to detect macroscopically whether a gall-bladder was diseased, but quite a large number of normal-looking gall-bladders were not healthy, and simple surgical drainage often relieved the patient. Moreover, if the gall-bladder was left, there was still something more to do if the symptoms did not abate. The duty of the physician included the treatment of the patient with drugs, but few drugs were specific, and he regarded the physician chiefly as a diagnostician. He would like to see the physician confident in the diagnosis of all complaints, and the surgeon proficient in operative technique; it would then be the duty of the physician to tell the surgeon what to do and leave it to his discretion to carry it out.

Dr. O. L. CARDEN SIBLEY said that it was the duty of the general practitioner to decide whether the patient required medical or surgical treatment. In the treatment of duodenal ulcer he agreed that the patient should be given prolonged medical treatment, and later, if that failed, be sent to a surgeon for gastro-enterostomy. But after operation he must continue to follow a duodenal diet sheet for months, and possibly years. If sent back to the physician and properly looked after, he would be cured; if not, he would be one of the failures of surgery.

Dr. H. H. SANGUINETTI thought that the powers of resistance of the patient should be fully investigated before operation, and in this connexion the opinion of the general practitioner would be valuable.

Mr. F. M. LOUGHNANE said that not enough surgery was being done at the present time. With an enlarged prostate, back pressure might exist without giving rise to symptoms, and that was the stage at which operation was desirable. General practitioners often delayed too long before calling in the surgeon to cases of appendicitis and peritonitis. Hurst admitted that 20 per cent. of chronic gastric ulcer cases died of carcinoma. Among those operated on the proportion was much less. Laparotomy did no harm and made it possible to prevent the onset of carcinoma.

Dr. HOWARD STRATFORD considered that there was a good deal of unnecessary surgical interference in the nasopharynx. He had seen few good results from septum operations. It was not merely the turbinals or septum which were at fault in nasal obstruction; the neighbouring sinuses were often chronically infected, and were extremely difficult to treat.

The PRESIDENT said that the development of preventive medicine might ultimately lead to the disappearance of surgery. Children and young adults should have periodic examinations to prevent the development of serious conditions later in life.

Mr. HAMBLEN THOMAS and Dr. GEOFFREY EVANS replied.—Mr. ZACHARY COPE said that he thought Mr. Loughnane was unduly severe in saying that the general practitioner called the surgeon in too late to cases of appendicitis. Often in such late cases the general practitioner had only been summoned himself an hour or two before.

LONDON ASSOCIATION OF THE MEDICAL WOMEN'S FEDERATION.

AT a meeting held on April 26th, with Dr. LETITIA FAIRFIELD, the President, in the chair, Lady BARRETT proposed that a group should be formed for the study of anæsthesia in midwifery, the group to be composed of women obstetricians and gynæcologists in London. This proposal was accepted.

Dr. GLADYS DODDS then delivered an address on the

Aschheim-Zondek Test.

Tests for pregnancy used in the past, she said, had shown a large percentage of error, but the accuracy of the Aschheim-Zondek test had been confirmed by everyone who had used it. During pregnancy the urine contained œstrin and a hormone secreted by the anterior lobe of the pituitary. It was upon the anterior lobe hormone that the test depended; the hormone stimulated the development of ovarian follicles and ovulation, as a result of which œstrin was secreted. It was non-specific, inducing changes in the ovary of the female and the testis in the male; œstrin, however, was a specifically female hormone. When the urine of a pregnant woman was injected

into immature mice, it produced ovarian changes which could be used for the diagnosis of pregnancy. The exact day on which the anterior lobe hormone first appeared in the urine of a pregnant woman had not been ascertained, but it was present by the third day after the first missed menstrual period, and it was thought to appear after embedding of the ovum. The amount of hormone secreted in the urine increased rapidly, and reached a maximum during the first two months of pregnancy; it disappeared on about the eighth day of the puerperium. The œstrin in the urine increased more slowly, and reached a maximum between the third and seventh months; it also disappeared on about the eighth day of the puerperium. Five immature female mice, each weighing 6 to 8 g. were used in making the diagnosis, and received injections of 5 c.cm. of urine over a period of three days; they were killed 100 hours later, and the ovaries examined. If the result was positive, certain typical changes would be found which were diagnostic of pregnancy in the patient. The test was valuable in distinguishing the amenorrhœa of pregnancy from amenorrhœa due to other causes. Fibroids complicating pregnancy sometimes led to difficulties of diagnosis. In pulmonary tuberculosis, heart disease, or chronic nephritis the test was particularly useful in establishing the diagnosis of pregnancy early; it could also be used in making the differential diagnosis between ectopic gestation and acute salpingitis or adnexal tumour. A positive result was not proof of a living pregnancy, but only of living placental tissue. In the presence of hydatidiform mole and chorion epithelioma the test was often positive with unusually high dilutions of urine. The greater the dilution the greater was the suspicion of some abnormality of the placental tissue. If the test had become negative following delivery, and subsequently became positive again, there was a strong suspicion that chorion epithelioma was present. She described a case of this kind in which pan-hysterectomy had been performed; the Aschheim-Zondek test had again become negative following the operation, and had remained negative ever since. There had been no sign of recurrence.

Dr. DULCIE STAVELEY then spoke on the

Diagnosis of Pregnancy by X Rays.

The fact of pregnancy, she said, was usually established before X rays were used. For diagnostic purposes radiography had little value before about the sixteenth week, though in the United States it was claimed that a diagnosis could be made at the fourteenth week. Usually X ray examination was used to confirm the diagnosis. A method of injecting lipiodol into the uterus in order to make an earlier diagnosis was said not to cause abortion, but it only showed a rounded swelling in the wall of the uterus, which was not in itself diagnostic of pregnancy. Adiposity of the patient might help to obscure the picture, and a lively baby sometimes spoiled the film by moving. The spine was the first part of the fœtus to become visible upon X ray examination and showed first as a row of stippled dots; patches of calcification in a fibroid might be confused with the early appearance of the spine. The maturity of the fœtus could be estimated by the size of the spine and skull, and by the appearance of the various bones in the skiagram. The os calcis appeared between the twenty-first and the twenty-ninth week, the astragalus between the twenty-fourth and the thirty-second week, and the epiphysis of the femur at about the thirty-sixth week. In a post-mature fœtus the epiphysis of the upper end of the tibia might be seen. Estimation of maturity, however, could not be made more accurately than within a fortnight. X rays were valuable in clearing up the diagnosis in cases of suspected multiple pregnancy. A dead fœtus could often be recognised by a sagging attitude, overlapping of the cranial bones and by the fact that no growth was seen to have taken place when a second examination was made after an interval; often, too, the fœtus would be found to be in exactly the same position at the second examination as at the first. Malpresentations such as breech with extended legs, face, and transverse presentations could be demonstrated by radiography. The placenta was not normally visible, but it might show calcified patches, and these might be useful in the diagnosis of placenta prævia. Abnormalities in the mother, such as lordosis, scoliosis, spondylitis, osteomalacia, or deformities of the pelvis or hip-joint could be demonstrated. Disproportion between the head and the pelvis could not be demonstrated well by a lateral view, but recently it had been made possible to take a vertical radiogram, showing the fit of the head in the pelvis, and measurements could be made against a calibrated scale. Abnormalities of the fœtus such as anencephaly, hydrocephaly, and even spina bifida might be demonstrated radiographically before birth. Dr. Staveley showed lantern slides of radiograms of the conditions described.

NEW INVENTIONS

A NEW URINOMETER PIPETTE.

THE urinometer pipette here illustrated has been found very convenient for use with the urinometer of Doremus. Instead of a teat there is a butt at the end which will fit on to an all-glass or Record syringe. It is graduated as usual to deliver 1 c.cm. In use, the syringe and pipette are assembled and the urine is drawn up into the pipette, any excess being expelled. The urine can then be slowly delivered into the urinometer in the usual manner. The advantages gained by the use of this combination over the ordinary pipette and teat are as follows: (1) As the urine can be expelled slowly there is no

reflux of the nitrogen into the short limb of the urinometer and thence its escape through the bulb into the air. This is a common experience when the teat is used and must vitiate the result of the estimation which may be important when the percentage of urea is small. (2) If the urinometer has not been recently used and reliance is placed on the teat it may be found that it has perished and spare teats may have likewise perished or be too small. (3) Time is saved as the teat has not to be manipulated down the pipette until the 1 c.cm. mark is reached if there is any excess urine drawn up. The illustration depicts a 5 c.cm. syringe, but for use with the urinometer of Doremus only a 1 c.cm. syringe is required. The combination as illustrated might be made use of when any small quantity of fluid is required; for instance, in measuring the urine when Gerrard's urinometer is used; but in that case a longer pipette would be required.

Messrs. Allen and Hanburys, Ltd., Wigmore-street, London, W., are the makers.

A. HILL JOSEPH, M.D. Lond.

REVIEWS AND NOTICES OF BOOKS

Manipulative Surgery.

By A. S. BLUNDELL BANKART, F.R.C.S., Orthopædic Surgeon, Middlesex Hospital, Royal National Orthopædic Hospital, and Hospital for Epilepsy and Paralysis, Maida Vale. London: Constable and Co. 1932. Pp. 150. 7*s*. 6*d*.

Mr. Blundell Bankart's aim has been to give a brief and intelligible account of some of the uses and abuses of manipulation in surgery. To this end he has included an account of those pathological conditions—excluding fractures and dislocations, and deformities such as club-foot—which most often call for manipulation in the course of their treatment. The general practitioner, for whom the book is primarily intended, is thus provided not merely with a narrow description of a particular method of therapeutics, but with guidance in the diagnosis and treatment of some common surgical affections. The author deals in general terms with sprains and adhesions, the postural activity of muscles, postural deficiency, torsion injuries, subluxation of joints, various forms of arthritis, and the general principles of manipulation with a note on its dangers and failures. Separate sections are then devoted to the foot, with special emphasis on foot strain; the knee; the hip; sprain of individual muscles and tendons in the lower extremity; the spine and pelvis; the fingers, hand, and wrist; the elbow and the shoulder. The last two sections of the book are devoted to a discussion of bone-setting and osteopathy, and to a concluding chapter which summarises arguments previously set out.

Of especial interest is the pronouncement that uterine displacements and intrapelvic diseases do not give rise to localised pain and tenderness over the back of the sacro-iliac joint, but that gynæcological operations often do put a very great and unnatural strain on the joints of the pelvis and lumbar spine. Mr. Bankart states categorically that uncomplicated sacro-iliac strain does not cause pain along the course of the sciatic nerve, and that "sciatica" is nearly always associated with spinal arthritis. Sacro-iliac strain can generally be cured by manipulation or if this is not successful by arthrodesis of the joint. He condemns the common practice of treating these cases with rest, local applications, massage, and exercises (without preliminary manipulation) and "sacro-iliac supports." Lumbar back-strain, which is the next common cause of low back pain, also responds to manipulation, but lumbo-sacral pain does not. Manipulation combined with efficient physiotherapy may be expected to benefit appreciably about half the cases of spinal arthritis with or without secondary sciatica.

For Mr. Bankart's views on the indications for manipulative surgery in various lesions of the joints of the limbs reference must be made to his book, where the appropriate technique is fully explained and illustrated. Here we need only note that he writes with lucidity and force, and that his book will be invaluable in helping to dissipate the atmosphere of mystery which bone-setters have allowed, and indeed encouraged, to become associated with their names. Though he has some hard things to say, the author does not say them in any spirit of vindictiveness. There is no reason why he or any orthopædic surgeon should be vindictive, but he shows that the interpretation which bone-setters themselves place on their clinical findings cannot be upheld on any anatomical or physiological grounds.

In the introduction of the book the physiological considerations underlying some of the general principles of orthopædic surgery are discussed in a highly illuminating manner and the same standard is maintained throughout.

This is indeed an admirable little book.

Genetic Principles in Medicine and Social Science.

By L. HOGBEN, M.A., D.Sc., Professor of Social Biology in the University of London. London: Williams and Norgate, Ltd. 1931. Pp. 230. 15*s*.

Prof. Hogben is always readable and usually interesting, and he has now written a book which should be important if some of those concerned will take what he says to heart. Briefly, his argument is that we now know enough about human inheritance to be sure that in some instances the genetical principles worked out on animals apply also to man, quantitatively as well as qualitatively, that the fanciful antithesis between nature and nurture must be given up, and that scientific inquiry has now advanced to the stage where research is justified and propaganda is not. He desires in short that the study of human genetics should be removed from the atmosphere of the drawing room to that of the laboratory, and that sincere scientific investigation should replace amateur political speculation. He believes, for example, that most of what has been said and written in recent years about the incidence and possible control of feeble-mindedness is superficial and misleading, that a single-gene hypothesis will not explain the whole of its genetic origin, and that there is clear evidence that Mongolian idiocy is largely due to environmental factors. We are not surprised therefore to find that he objects to what he frankly calls the aristocratic bias in which eugenists have so freely indulged and begs them to be a little more sure of the facts before they clamour for practical action. In particular he points out in several places how the medical profession can help in accumulating the data which are so much needed, and his book certainly ought to stimulate a number of people to take a hand in so good a cause.

Artériographie des membres et de l'aorte abdominale.

By REYNALDO DOS SANTOS, Professor of the Faculty of Medicine of Lisbon, Surgeon to the Hospitals; and A. C. LAMAS and J. P. CALDAS, both Surgeons to the Hospitals, Lisbon. Paris: Masson et Cie. 1932. Pp. 192. Fr.45.

THE pioneer work of certain Lisbon surgeons on the injection of arteries in the living subject has excited widespread interest. It has been developed so far afield as Japan where an oily medium for the opaque substance has, it is claimed, obviated certain dangers and made anæsthesia unnecessary. In an interesting little book Prof. dos Santos and two surgical colleagues admit the drawbacks which attend the use of lipiodol. Their own early work was carried out with uroselectan and abrodil, but they now extol the virtues of a new thorium compound of which the injection is said to be painless. By puncturing the vessels, mostly under anæsthesia, which is unnecessary with the thorium compound, the authors have examined 300 cases, ranging from gangrene of the limbs to aneurysm of the aorta, and they describe

also a great deal of work done in abdominal investigation. Some of the most striking results are to be seen in the diagnoses of kidney conditions. The illustrations are clear and documented; radiograms taken at the time of injection are accompanied by a description of symptoms, and a note of the method of injection and of the results obtained from the reading of the radiogram. Throughout the book it is emphasised that the method is safe, at least in experienced hands, and whilst the authors regard it as of great value, they point out modestly that they are only building up their experience and are not dogmatic as to the results.

It is obvious, we think, to anyone who reads the book carefully, that new horizons of investigation and diagnosis have been opened by this work. It is difficult to convey the curious results of the opaque injection of arteries to anyone who has not been fortunate enough to see the radiograms. For diagnostic purposes such conditions as the displacement of an artery by a tumour can be shown, and occasionally the abnormal formation and distribution of vessels in sarcomata can be observed. The book is written in French and has a short preface by Prof. Leriche. The illustrations are mostly well reproduced.

Schizophrenia (Dementia Præcox).

An Investigation of the Most Recent Advances. By Various Contributors. London: Baillière, Tindall, and Cox. 1931. Pp. 246. 21*s*.

THE earlier volume on schizophrenia in this series is now supplemented by the collection of papers, read in 1929 at the tenth annual meeting of the Association for Research in Nervous and Mental Disease. The clinical section opens with a paper by Malamud and Rothschild on the permeability of the barrier between blood and cerebro-spinal fluid, examined according to Walter's method; the distribution-ratio of the bromide was found to be high in a majority of the 210 cases examined, and the general findings of the German workers were corroborated. The deficiency of catalytic iron in the ganglion cells of the cerebral cortex in schizophrenia is confirmed by W. Freeman, who refers to the earlier investigations of Koch and Mann. P. J. Trentzsch writes briefly on the results of testing the circulatory system in the usual way; his conclusions are too far-reaching. A somewhat banal essay by Macfie Campbell pleads that the benefit of the doubt be given to environmental factors in the ætiology of psychosis. An unfinished statistical study of prepsychotic personality by Bowman and Raymond yields a number of interesting findings, some of them running counter to current teaching. Jelliffe's article on Vigilance, Motor Pattern and Inner Meaning is rather a hotch-potch, being an unsuccessful attempt at synthesis; the careless style makes it difficult to read.

A sober sketch of the position with regard to anatomical findings in schizophrenia, by the Munich pathologist, W. Spielmeyer, is followed by H. S. Sullivan's brief reassertion of the familiar rule that a stormy onset in schizophrenia suggests a favourable outcome. A more serious study of prognosis is that of E. A. Strecker, amplifying his earlier report; the cases of 25 schizophrenic patients who recovered are examined in detail. G. Zilboorg presents a paper on treatment, viewed as a matter of affective reintegration; it covers more than its subject, and is ill-grounded in its assertions about the nature of schizophrenic thought-disorder; it is a psychoanalytical study, argument being based on the single instance. A summary of the results obtained by different methods of treatment, by L. E. Hinsie, and a report on the effect of sodium amytal as a narcotising agent in 15 cases of catatonia, by W. J. Bleckwenn, conclude the volume. After nearly all the papers a verbatim account is given of the discussion which followed.

The book is uneven in quality, but it bespeaks the wide range and activity of research into this problem that is going on in the United States.

Views and Reviews.

First Series 1884–1919. By HAVELOCK ELLIS. London: Desmond Harmsworth. 1932. Pp. 322. 10*s*. 6*d*.

THIS volume contains thirty-two hitherto uncollected essays arranged in chronological order and covering a period of 35 years—1884 to 1919—in the life of the distinguished humanist. A chronological series of essays by a man of numerous interests and wide culture must make disorderly reading, inasmuch as at an average of every ten pages the subject changes entirely. Mr. Ellis in a prefatory note acknowledges that the essays are so various in character that they cannot be classified, the one thing that they have in common being "that it has never proved possible to fit any of them into my books." Some of them seem hardly to be worth resuscitating, but others make enjoyable reading, and often the date is of significance, inasmuch as the period in which an article was written may supply interesting sidelights on the matter discussed. A second series will follow including essays which appeared between the years 1919–1932.

The Philosophy of Sport.

By P. MCBRIDE, M.D., F.R.C.P.E., F.R.S.E. London: Heath Cranton, Ltd. 1932. Pp. 190. 7*s*. 6*d*.

THESE chapters on sport in its various aspects make interesting reading; the reflections are based on personal experience and cover a wide range, inasmuch as the author enjoyed unusual opportunities for the exercise of many diversions. In a summary of the developments of sport during the past 50 years, contributed recently by Lord Desborough to a series of articles in the *Times*, the question was raised whether the word "sport" should include games, or should be confined to such varieties as implied the pursuit of a quarry. In the greater part of Dr. McBride's book he follows the latter definition, being very interesting in regard to fishing, shooting, and hunting, but nearly silent in respect of the playing of ball games. He recognises, however, that for reasons of economy the number of those who can engage in the sport that demands a quarry must be small compared to the number of those who can take their exercise and gain their amusement at football, cricket, or golf, and in discussing the growth and decline of sporting tastes and the British attitude towards sport he is informing. In one chapter he gives a scheme of physical culture, derived from Mr. Bruce Sutherland, into which he has introduced certain modifications, which is certainly rather an excrescence on the scheme of the book, but is justified by the medical authorship. Most of the exercises laid down are familiar, but they are set out very clearly, and there is no doubt that regular practice in them would often conduce to improvement in health.

THE LANCET.

LONDON: SATURDAY, MAY 14, 1932.

THE POWERS OF MINISTERS.

PUBLIC opinion has long been uneasy about bureaucracy and the undying rule of D.O.R.A. To various citizens bureaucracy variously means the arbitrary usurpation of legislative or judicial functions, the too paternal limitation of our liberties and simple pleasures, the intolerable infallibility of all jacks-in-office (whether the office is central or local), and the intrusive importunities of the tax collector. As to the survival of D.O.R.A., we vaguely understand that the Defence of the Realm Acts and Regulations, operating only for the duration of the war, have expired, though several elements of permanent value have been incorporated in the statute-book as post-war Acts of Parliament, the Dangerous Drugs Act of 1920 being an obvious example. It is unfair to scold the Civil Service for matters of policy. The irritating restriction on the sale of chocolates in theatres was the direct and deliberate decision of a post-war Parliament; the same is true of the "permitted hours" for the sale of alcohol. But, if some of our complaints against bureaucracy must be laid at the door of Parliament, there is nevertheless a popular impression that Whitehall takes too much upon itself. When our Civil Servants were solemnly indicted by so brilliant an advocate as the Lord Chief Justice, some notice had to be taken. In the Donoughmore Committee on Ministers' Powers the Lord Chancellor assembled a strong tribunal of investigation. Its report (Cmd. 4060, 2*s.* 6*d.*), if in places discursive and didactic, is almost the first effort to face the problem; it tells us how far our complaints are justified.

The first half of the inquiry concerned delegated legislation. Is the system of departmental rules and orders improper? Has it been abused? The report declares it to be inevitable; the senior Parliamentary Counsel testified that, if we must have all the new legislation which the country is supposed to want, Parliament itself cannot cope with the task unaided. The Committee assures us that the practice is not unconstitutional. How could it be? Parliament cannot simultaneously surrender its functions to a Minister and complain that he usurps them. Nor is the system new: official statistics surprisingly showed that fewer Statutory Rules and Orders have been registered annually in the past few years than in many years before the war. But, if the quantity is not increasing, the scope is changing. The advantage of flexibility and experiment, the technicality of the subject matter and the impossibility of foreseeing all contingencies and local conditions—these explain the convenience of delegated legislation. The pressure on Parliamentary time, it is admitted, means the progressive incapacity of Parliament as a legislative machine. If Bills are to pass, short cuts are necessary. When, for instance, the Mental Treatment Act instituted temporary treatment for mental patients, it left the Board of Control to make a code for the conditions of their detention. Finally, in face of genuine emergencies—a great war, a general strike, or a financial crisis—the common sense of Englishmen will tolerate exceptional methods. Plague in the Baltic in 1710, cattle distemper in 1746, and cholera in 1832 provided precedents for delegation. Remarkable recent examples, for imposing salary cuts or for taxing imports, are justified, if at all, by the emergency. Yet even here Parliament advertises its legislative failure. The bundle of Orders in Council under the National Economy Act, which played havoc with the statute-book last October, might just as well have been enacted by Parliament itself if the machine could work as swiftly as when it lately passed the Act to indemnify Presidents of the Board of Trade. In pronouncing delegated legislation to be not only convenient but also necessary, the Committee rightly insists upon safeguards. The greatest of these are the power to fix responsibility upon the Minister and the power of the law courts to quash a regulation as ultra vires. Proper publicity and prior consultation with interests concerned are other sensible precautions. The Committee recommends, too, a new and special Parliamentary scrutiny both of Bills which propose delegation and of the departmental rules and orders which flow therefrom. The work of scrutiny will probably fall mainly on the officials of the two Houses, but the principle will serve to remind the members themselves of the duty of vigilance.

The second half of the inquiry concerned the quasi-judicial functions entrusted to Ministers and departmental tribunals, often to the exclusion of the judges' jurisdiction. The medical profession is well aware of this process in the operation of the National Health Insurance Act. Naturally the central and local administration of matters like housing and public health requires the enforcement of standards which are more a matter of social policy than of judicial interpretation. In appeals on questions of reasonable fitness for human habitation, house drainage, or sanitary accommodation, the Minister has the last word. His punitive power over panel practitioners is great. It has been complained too that his procedure is peculiar, for instance, in deciding upon boundary extensions or slum clearance orders. A visible inspector may hold a local inquiry. After hearing evidence which is often irrelevant, he reports in secret to an invisible and anonymous body which reaches conclusions partly judicial, partly administrative; finally the department announces its decision without necessarily giving reasons or following precedents. Notwithstanding certain judicial dicta in the Arlidge case, the Donoughmore Committee advises the publication of inspectors' reports. It lays down valuable principles as to the elements of natural justice which departments must respect. A Minister ought not to be a judge in his own

cause. It advocates supervision by the High Court wherever it can be alleged that the Minister or departmental tribunal has exceeded statutory powers. It recommends a right of appeal on points of law; but not on points of fact. And, to simplify recourse to the law courts, the Committee advises that the Crown Proceedings Bill be passed into law and that the archaic procedure of certiorari, mandamus, and the like be replaced by something more modern and less cumbrous.

In both parts of its inquiry the Committee's report, after opening our eyes to the gravity of the problem, is reasonably reassuring. The situation contains elements of danger; safeguards are necessary; but as yet there has been no serious abuse. Part of the trouble, we are told, comes from the obscurity of the language of statutes. Some of the departmental rules and regulations, it is added, are framed by departmental legal advisers who are not as careful as the Parliamentary Counsel to avoid exceeding statutory powers. This is strange. The now much enlarged office of the Parliamentary Counsel is largely recruited from the departmental legal advisers; the latter must always be in constant touch with the former; why cannot the departmental advisers be brought up to a uniform high standard? On the whole the Donoughmore Committee makes us feel that we know the worst. Parliament, says the report, has not realised the extent of its surrender. The warning is useful. Lord HEWART is thanked for sounding the alarm, but the conspiracy theory, set forth in the "New Despotism," is definitely found to be without a shred of evidence. The departments are discharged without a stain upon their character but are told to be more careful in future.

THE PREVENTION OF DIPHTHERIA.

IN this country active immunisation as a communal measure of protection against diphtheria makes but slow progress. Yet Surgeon-Captain S. F. DUDLEY [1] believes that if as many as 80 or 90 per cent. of children under 10 years of age could be maintained Schick-immune, diphtheria would for practical purposes vanish within five years. This view is founded on results already obtained elsewhere. Ample evidence is now available that the incidence of diphtheria can be reduced to negligible proportions by immunisation on a sufficiently large scale. In Canada, for example, according to M. M. G. RAMON and R. DEBRÉ,[2] nearly 1,000,000 people out of a population of 10,000,000 have been immunised, with the result that diphtheria morbidity has been reduced by nine-tenths. But when individual cities are compared it appears that the production of a high aggregate of immunes of all ages is not nearly so effective in reducing the incidence of diphtheria as is concentration of effort—though not to the exclusion of other age-groups—upon children of pre-school age. DUDLEY compares the results of intensive anti-diphtheria campaigns recorded by J. G. FITZGERALD, of Toronto, and by M. A. Ross and N. E. MCKINNON, of Hamilton, Ontario. In Toronto, although a full immunisation course was followed by the practical eradication of diphtheria from the group protected, there was no evidence that the total diphtheria morbidity had fallen. This, DUDLEY suggests, is because only a third of the school-children and apparently no pre-school-children were protected. He concludes that the proportion of the school population immunised was too small to afford any indirect protection to the uninoculated. In Hamilton, a city of 129,000, the average annual incidence of diphtheria between 1905 and 1924 was 284 per 100,000. In 1925 an intensive campaign resulted in the immunisation of some 26,000 children in the school and pre-school groups and a drop in the morbidity-rate to nine per 100,000 during each of the years 1927 to 1930. In Hamilton, not only was a greater proportion of school-children immunised than in Toronto, but relatively as many of the pre-school-children were also protected. From these data DUDLEY deduces that immunisation of the pre-school group is of supreme importance. His deduction is borne out by the observations of E. S. GODFREY [3] who from a study of the experiences of cities in New York State during the past nine years concludes that to produce a definite effect upon the incidence of diphtheria it is not enough that children between 5 and 14 should attain a high degree of herd immunity. GODFREY cites examples to show that when the immunisation of 30 per cent. or more of children under 5 is superimposed "there is an immediate and definite decline in the current prevalence of diphtheria." He finds that in order to affect the diphtheria-rate favourably this critical proportion must be attained and sustained. In only two instances known to him has a community that had attained the 30 per cent. immunisation-rate of its under 5 age-group suffered even a moderate epidemic. He sees no reason to believe that immunisation *confined* to this group would be equally effective, and he also thinks it possible that immunisation of this group should be largely concentrated in sections of highest prevalence or—when it is not prevalent—in congested areas.

GODFREY suggests that the reason why immunisation of a small fraction of the under 5 group has a greater effect than immunisation of a large fraction of older children may be that atypical, larval cases, which are never diagnosed, exist in greatest numbers in this youngest group, and in this connexion he calls especial attention to the danger of an unrecognised case of nasal diphtheria. Although it is not definitely stated in his paper it seems from internal evidence that Schick tests were not, as a rule, carried out. Thus, in both the age-groups in question a number of children would be "immunised" who were in fact already immune. From what is known of the percentage of Schick-positive reactors in various age-groups in any community it is certain that immunisation

[1] Quart. Jour. Med., April, 1932, p. 213.
[2] Presse Méd., April 9th, p. 545.
[3] Amer. Jour. Pub. Health, March, 1932, p. 237.

of the under 5 group would include more positive reactors than any group of the same size composed of older children. Whereas the immunisation of 1000 children below 5 might create as many as 500 or 600 fresh immunes, in the older age-groups the fresh immunes produced might not exceed 300 or 400 per 1000 "immunised," depending in each case upon the environment and social status of the children treated. It is clear that a smaller percentage of mass immunisations of young children must be more valuable as a preventive measure than a larger percentage carried out upon older subjects. GODFREY remarks that the evidence whether active immunisation does or does not prevent the individual from becoming a carrier is equivocal. In any case, he thinks, the reduction of the carrier-rate is probably a relatively unimportant factor, and indeed—since carriers "tend to develop carriers and presumably immunity, whilst cases have a much greater tendency to develop new cases"—the carrier, although a chief source of infection, may be regarded "as the cheapest source of naturally acquired immunity." In another paper DUDLEY [4] describes some interesting observations at Greenwich Hospital School, the source of many valuable contributions to the epidemiology of diphtheria, upon latent infection with *C. diphtheriæ*. Although there is as yet no satisfactory evidence than an avirulent strain of diphtheria bacilli may acquire virulence, it is generally accepted that the reverse may happen. DUDLEY thinks that the anomalies which he found in the distribution of latent infections and Schick immunity in this semi-isolated community may be satisfactorily explained upon the hypothesis that when a Schick susceptible is infected with virulent diphtheria bacilli the latter often acquire avirulence. It is to be hoped that further observations may be carried out in order to show with what frequency this loss of virulence occurs amongst infected Schick positives in the general community.

Discussing the relative value of some diphtheria prophylactics, DUDLEY [1] insists that comparative tests should be made upon groups which not only have the same original Schick reaction frequencies but which, during the time of their immunisation, live under identical conditions, especially as regards risk of infection with virulent diphtheria bacilli. In the earlier days of immunisation the prophylactic used was toxin mixed with antitoxin (T.A.T.) in such a way that toxin was slightly in excess. T.A.T. is still used in America, but there, as in other countries, it is being or has been replaced by some preparation of toxoid (GLENNY), the anatoxin of RAMON. Not only is toxoid free from the objections which have been urged against T.A.T.—its liability to dissociation of toxin under unsuitable conditions of storage, and the possibility, largely theoretical, of producing sensitisation to horse serum—but, as DUDLEY points out, it is a much more powerful antigen. He quotes the results of W. T. HARRISON, G. F. and G. H. DICK, G. RAMON, and himself, which go to show that 94 to 97 per cent. of susceptibles, whether adults or children, who received toxoid became negative Schick reactors within a few months. In HARRISON'S experience any batch of toxoid immunised about 30 per cent. more children than any batch of T.A.T. It has been objected, however, that toxoid at full strength, especially in adults, gives rise to troublesome reactions. In this country, in order not to diminish or even extinguish totally the very feeble flame of enthusiasm for active immunisation, it has been considered important to use prophylactics which caused an absolute minimum of reactions. RAMON and DEBRÉ [2] hold that this objection to toxoid (anatoxin) has been greatly exaggerated. They claim that millions of injections have been followed by a very small percentage of slight reactions and by a trifling number of somewhat more severe happenings, and are satisfied that in France such reactions as occur cause no concern either to the doctors or the public. RAMON and DEBRÉ deprecate this fear of reactions, and think that the modified prophylactics such as toxoid-antitoxin (T.A.M.) and toxoid-antitoxin floccules (T.A.F.), both of which are widely used in this country, possess no advantages over anatoxin. DUDLEY finds not only that the reactions following toxoid are more frequent age for age than after floccules, but that the reactions following RAMON'S toxoid were more intense than those caused by English toxoid, whereas the immunising powers of the French and English preparations were equal. He considers that in the case of adults and protein-sensitive reactors, in whom toxoid may produce very unpleasant symptoms, floccules should always be used when available. The ideal prophylactic would, of course, be one which as the result of a single symptomless injection produced solid immunity in a short time. RAMON and DEBRÉ refer to the work of CLAUS JENSEN, who succeeded in preparing a concentrated toxoid of such high antigenic value that the injection of 1 c.cm. into 100 Schick-positive children rendered 91 per cent. immune in a month. Whilst applauding this success they point out that it would be necessary to prepare about 60,000 litres of ordinary toxoid (anatoxin) in order to furnish sufficient of the concentrated product to immunise 1,000,000 children. If three injections of RAMON'S standard preparation were used, only 3000 litres would be required.

In order to simplify and popularise immunisation the introduction of the antigen by routes other than subcutaneous or intramuscular has been tried. Oral administration of anatoxin was shown by RAMON and C. ZOELLER (1926) to be valueless. The inferiority of the oral route in the case of scarlet fever toxin has recently been demonstrated by the DICKS.[5] These observers found that the ingestion of an average total exceeding 8,000,000 skin test doses per person only immunised 73·1 per cent. of a series of Dick-positive reactors, whereas when the same toxin was injected subcutaneously into another series of susceptibles a total of 135,500 skin test doses per person converted 93 per cent.

[4] Jour. Hygiene, April, 1932, p. 193.

[5] Jour. Amer. Med. Assoc., April 23rd, 1932.

into negative reactors. Loewenstein's ointment which contains not only toxoid but a killed culture of diphtheria bacilli has been used upon a fairly considerable scale. Three inunctions of this ointment are made. The results, as RAMON and DEBRÉ abundantly show, are far inferior to those obtained by the injection of toxoid and may give rise to an entirely false sense of security. It is no good dallying, writes DUDLEY, with weak or diluted prophylactics if ever active immunisation is, to eradicate diphtheria from the population at large. As a first essential, however, there must be effective propaganda and coördinated effort, in order that the public may realise, as it does whenever properly instructed, that at the cost of, at most, trifling discomfort to its children, the nation may rid itself of diphtheria with all the suffering, mortality, and expense which the endemicity of this disease imposes.

MEDICAL ENTRY TO PRIVATE SCHOOLS.

EIGHTEEN months ago Sir CHARLES TREVELYAN, then President of the Board of Education, set up a committee to consider what should be done to secure an adequate education under suitable conditions for children attending private schools. The report[1] as now published covers a wide ground, for the term "private school" is used as a convenient name to cover all schools not in receipt of grants from public funds, and the word "proprietor" for the person or persons responsible for them, though they may be the governing bodies of public schools, while the word "children" is not confined to pupils between 5 and 14. Thus construed the problem concerns some 10,000 schools with 400,000 scholars. A large proportion of these schools are excellent; in a few the conditions are seriously defective. Some of them already are inspected, and the Society of Medical Officers of Health urged on the committee that all private schools should be inspected and supervised at least as regards their premises and the general physical conditions. For the purpose of their evidence this society made special inquiries in selected areas with the following result:

In about 25 per cent. of the cases investigated the schools were carried on under conditions "which can only be described as bad." The natural lighting of the class-rooms was generally sufficient but the desks were ill arranged in relation to the light. In a high proportion of cases the artificial lighting was defective. The ventilation was generally only that of the rooms in an ordinary dwelling-house, and without cross ventilation more cubic space and floor space per scholar were required. The desks were commonly of an obsolete or unsatisfactory pattern and in some schools forms without back rests were used. The great majority of the small schools paid little attention to the provision of proper cloakrooms and of facilities for drying outdoor garments. The closet accommodation was usually inadequate in comparison with the Board of Education standard and in the smaller schools it was rare to find separate closet accommodation for boys and girls. Facilities for washing were frequently lacking or consisted of a sink in the scullery. In one area two out of 10 schools inspected were seriously overcrowded, one having 34 children in a room 21 ft. by 13 ft., and another having 21 children in a room 14 ft. by 13 ft. In some schools there was no playground, in many others only a small backyard. As delicate children were apt to attend these schools the Society considered that the absence of facilities for open air exercise was particularly regrettable.

In another area a school medical officer who inspected three private schools chosen at random, found one fairly satisfactorily housed. A second containing six children was conducted apparently in a converted cellar, badly lighted and too small and overcrowded with furniture to accommodate the children. The third, established for 25 years, contained 20 children all taught in one bedroom measuring 13 ft. by 13 ft. There was no playground except the road.

The law as it stands gives power under the Education Act to prosecute a parent whose child is not receiving efficient instruction, and under the Public Health Act to secure abatement of nuisances on premises; but the mechanism is cumbersome and ineffective. The committee finds the remedy in a scheme of public supervision based upon inspection; to apply to all private schools with certain specified exceptions. Inspection would cover both the instruction and the premises, including the residential accommodation in boarding-schools, and the scheme would include power to compel the closure of schools failing to comply with the minimum requirements, the question of compliance to be determined ultimately by a court of law. The staff employed would be the ordinary inspectorate of the Board of Education or of the local education authorities. While regular medical inspection of children in private schools should be encouraged in every possible way, the committee does not recommend placing on proprietors a statutory obligation to provide such inspection. Boarding-schools however would be required to state on the registration form and in subsequent annual returns the name of the medical practitioner whose services are available in cases of sickness or injury. The nursing arrangements and the accommodation for such cases would be considered during the inspection of the school and dealt with in the inspector's report.

The report is excellent, but seems to us not to stress sufficiently the part which might be played by medical science. If a bench is asked to order the closure of a school on the ground that the conditions are prejudicial to the health of the children, the magistrates will certainly insist on having the evidence of a medical officer. Yet the report seems to contemplate that all the conditions of health should fall within the purview of the educational inspection. Medical inspection is to be encouraged but not made obligatory. If it were made a condition of registration that a medical practitioner should be attached to every school to supervise the health of the children, a big step forward would have been taken. It is true that official medical inspection might cause difficulties with some parents, but the objection would probably disappear if the examiner were a respected local practitioner, and exemption might be granted to children who brought a simple record of physical condition written out by the family doctor. Boarding-schools are to be required to name the doctor whose services are available in cases of sickness or injury, and the value of

[1] H.M. Stationery Office. 1s. 6d.

this course would be greatly enhanced if he were asked to supervise all the conditions of health and hygiene. The question of expense may be crucial at the moment. The committee asks for the report to be read as representing its views of the steps which *in normal financial conditions* would be appropriate for dealing with the defects revealed in the course of its proceedings. It deprecates piecemeal treatment by such preliminary measures as can be taken without incurring new expenditure. This may mean that no action can be looked for until the economic urge has passed. But no one who reads the report will be content to let matters remain as they are, and public opinion may insist on immediate improvement. At all events local authorities may decide to make fuller use of the powers they have, and should find their task lightened by magistrates who have read the report. Prudent parents will seek medical advice before sending their children to an unknown school.

ANNOTATIONS

AWARD TO PROF. THEOBALD SMITH.

THE Manson medal for tropical medical research, given triennially by the Royal Society of Tropical Medicine and Hygiene, has this year been awarded to Dr. Theobald Smith, director emeritus of the department of animal pathology of the Rockefeller Institute of Medical Research. In association with Kilborne in 1893, Theobald Smith showed that red-water fever in cattle was transmitted by ticks, and at the same time demonstrated the passage of infection through the ova of one generation of ticks to the next. This discovery proved for the first time that a protozoal parasite of mammals could be disseminated by the bite of a blood-sucking arthropod. Probably because Theobald Smith was dealing with a cattle rather than a human disease this great event in the history of medicine received scant recognition, though it preceded the better known work of Bruce on the transmission of sleeping-sickness and that of Ross on malaria. Furthermore, in 1893 Manson's hypothesis regarding the mosquito transmission of *Filaria bancrofti* constituted only half the truth, since he thought man was infected via mosquito-contaminated water either by swallowing the escaped microfilariæ or through their penetrating the skin of man. Indeed, it was not until March, 1900, when Low demonstrated filarial embryos in the proboscis of infected mosquitoes sent to Manson from the younger Bancroft that the true mechanism of their entry during biting was understood. It is thus no over-statement of the case to say that Theobald Smith was the first to transfer the insect transmission theory of protozoal disease from the realms of hypothesis to those of established fact. In 1904 Theobald Smith reported anaphylactic symptoms in dogs and rabbits, and in a letter to Ehrlich wrote the original description of the classical anaphylactic shock in guinea-pigs, often known as the Theobald Smith phenomenon. In 1907 he proved that it was possible to immunise guinea-pigs actively by the injection of a balanced mixture of diphtheria toxin and antitoxin and two years later suggested further investigations of the method with a view to its ultimate application to human beings, thus anticipating Behring and Park's work by several years.

The previous recipients of the Manson medal have been Sir David Bruce (1923), Senator Ettore Marchiafava (1926), and Sir Ronald Ross (1929).

CEREBRO-SPINAL FLUID IN CEREBRAL TUMOUR.

LUMBAR puncture has been followed by death in so many cases of cerebral tumour that it is considered by many to be an essentially dangerous operation in that condition. And this is undoubtedly true unless a careful technique is followed. F. Fremont Smith[1] from a large experience concludes that when papillœdema is present the dangers of lumbar puncture more than counterbalance the information which is likely to be gained from it. In such cases puncture of one or both lateral ventricles is safer and more useful. When, on the other hand, there is no papillœdema, lumbar puncture is of great value. A fine needle with a manometric attachment is used, and the patient is kept in the horizontal position during and after the puncture. The pressure of the fluid is measured, and the absence of block at the foramen magnum and at the point of the needle is tested first by jugular and then by abdominal compression. Besides the usual examinations for colour, cells, and protein, a more detailed chemical examination may be made with the view of excluding uræmia, but usually only the minimum quantity required for the essential tests should be removed. With these precautions lumbar puncture is not dangerous in itself, and it may be of great service in indicating the presence and the degree of intracranial pressure. But when the patient has been dehydrated by cathartics or by the rectal administration of hypertonic saline, pressure readings are valueless. Normal readings may also be obtained with small tumours in the pituitary region, and with some infiltrating growths of the pons.

Ventricular puncture has a special value in that the fluid drawn from the ventricle on the side of the tumour may be yellow, and often contains appreciably more protein than that from the opposite ventricle. The combination of ventricular with lumbar puncture also has its uses in showing by manometric or colorimetric examination the degree of blockage between these two points on the cerebro-spinal fluid system. A block may be caused by tumour in the posterior fossa, by closure of the foramina round the fourth ventricle, or by a cerebellar pressure cone. While it may not always be possible to distinguish between these, there are cases in which combined puncture has a definite diagnostic value.

In a table attached to his paper, Fremont Smith gives many valuable hints on the differential diagnosis of cerebral tumours from other conditions by such complete examinations of the cerebro-spinal fluid. It would be impossible even to summarise these in a limited space, but they indicate the great number of questions which must be answered before we can make the diagnosis of cerebral tumour in the earlier stages. It is not yet generally recognised that a considerable proportion of patients with cerebral tumour die without having developed papillœdema, and even when this is present it is necessary to exclude other possible causes for it, of which the most important are sinus thrombosis and hydrocephalus. It is probable that ventricular puncture might solve some of the difficulties with which these cases are surrounded, but the difficulties and dangers of the operation are likely to delay its acceptance as a routine measure in obscure cases.

[1] Arch. Neurol. and Psychiat., March, 1932, p. 691.

THE WHITE BLOOD-CELL COUNT IN THE NEWLY BORN.

THE blood of new-born infants shows a high white cell count, chiefly accounted for by polymorphonuclear cells with a tendency to immaturity. A few days after birth the blood picture changes rapidly to the normal infantile count with a predominance of lymphocytes. Dr. W. Bayer,[1] assistant in Prof. Czerny's clinic in Berlin, has been looking for an explanation of the postnatal leucocytosis. Existing theories include such explanations as concentration of the blood in the first few days of life, the reaction of the organism to extra-uterine life, sudden loss of some regulating factor present in the maternal blood, endocrine disturbances at the time of birth, and the reaction of the infant to some tissue-injury brought about by birth trauma. Bayer examines these theories and finds them mostly inadequate. In his own investigations he first of all carried out a careful series of white cell counts on 20 normal new-born infants and confirmed the accepted view that polymorphonuclear cells amounted to 62 to 65 per cent. of the total white cell count on the first day of extra-uterine life, while by the third to fifth day the lymphocytic percentage had usually crept up to between 50 and 60 per cent. He next studied a series of infants delivered by Cæsarean section, paying special attention to those instances where labour had not begun and where there had been no preliminary interference of any sort. He showed that the white cell counts in this series were identical with those found in babies after normal labour. This fact eliminates several of the theories outlined above. Next he examined 11 infants who during birth showed either hæmorrhage into the skin or cephalhæmatoma or hæmorrhage from the alimentary canal. They all had white cell counts exactly similar, as regards the polymorphonuclear leucocytosis, to those of normal infants. One of the highest percentages of these cells found was in a baby which was asphyxiated at birth. In this case, too, there was a marked "shift to the left" and these facts are significant in view of certain later findings. Bayer proceeded to try to find out what it was that controlled the postnatal development of the white cells and what determined a myelogenous activity immediately before and after birth. A series of animal experiments with various hormones yielded almost uniformly negative results. Endocrine secretions were chosen which might be expected to be present in the maternal blood before birth such as Prolan (anterior pituitary), Unden (ovarian), Progynon (ovarian), placental extracts, and thymus extracts. Experiments on mice showed that the blood picture could not be altered in new-born animals by injecting these hormones either into the mothers or the offspring. Lastly he investigated the influence of carbon dioxide and oxygen on the blood picture and was able to prove that with an increase in the carbon dioxide content of the air breathed animals develop a polymorphonuclear leucocytosis with a "shift to the left" just as in the new-born child. He comes to the conclusion that this explains the phenomenon. He quotes various authorities regarding the oxygen content of the blood of the fœtus or new-born infant, and concludes that a deficiency of oxygen and an increase in the carbon dioxide is constant at this period of life. The fact that the child with asphyxia showed the blood picture in an extreme form bears out his theory.

[1] Jahrb. f. Kinderh., 1932, cxxxiv., 304.

Dr. Bayer's conclusion opens up many fields for speculation. Is it possible, he asks, in effect, that a chemical stimulus in the blood is the cause of leucocytosis in other conditions? What, for example, is the relationship of blood oxygen and blood carbon dioxide in leukæmia?

OVERCROWDED BIRMINGHAM INSTITUTIONS.

MANY public assistance areas have inherited costly problems from the old boards of guardians, but few of them are so serious as that which faces the great county borough of Birmingham. Infirmaries and mental hospitals lack satisfactory classification of inmates, and several of them are overcrowded. The work of redistribution had been begun by the guardians, but was far from complete when they were superseded. The city council is, therefore, called upon to complete this by no means easy task, and according to a comprehensive report by Dr. H. P. Newsholme, the medical officer, it will cost over £192,000. This is an alarming figure just now, even for Birmingham, especially since Dr. Newsholme assures the council that the matter is of immediate importance. Nor is it easy to question such urgency when he points out that in three of the institutions there is a serious degree of overcrowding, and that much inconvenience results from imperfect classification. Pressure upon space is not the only difficulty that has to be removed; the administrative problems involved in a mixture of different classes of patients are, or may be, acute. At Erdington House, for instance, two-thirds of the 1772 inmates are mental patients of different classifications. Only about 10 per cent. are certified as insane, and less than 20 per cent. as mentally deficient. Who is to control such an institution? The mental hospitals committee is entitled only to deal with patients under the Lunacy Acts, and the Mental Deficiency Acts committee only with the deficient. The proposed comprehensive scheme of reclassification would enable every type of inmate to be housed in a more satisfactory way and, with the help of extensions, would bring together in one institution classes of patients now scattered through two or three. Order would thus replace disorder, and administration be simplified. The report has been approved, but nothing will actually be done until the committees concerned ask for the authority of the council to spend the money. There is, moreover, another and an important preliminary. Under the Local Government Act of 1929 the proposals must be submitted to the local hospitals council, which may, perhaps, be concerned to find that while the scheme facilitates transfer it provides no accommodation for additional patients.

DISPLACEMENT METHOD IN NASAL SINUSITIS.

THIS method of introducing fluids into the nasal sinuses was elaborated by A.-W. Proetz and, being easy, harmless, and painless, possesses obvious advantages over methods of injection by means of a cannula or trocar. It is used principally to fill the sinuses with lipiodol before skiagraphy, but may also be employed for the introduction of medicaments. Drs. J.-M. Le Mée and M. Bouchet[1] describe its technique and uses from their experience at the Necker-Enfants-Malades Hospital. The physical principle of the method is this: if a test-tube is divided by a narrow constriction into two chambers, and the upper one filled with fluid, the liquid will not penetrate into the lower by reason of its content

[1] Presse Médicale, March 12th, p. 393.

of air; if now aspiration be applied to the upper chamber, bubbles of air will escape from the lower and, when the aspiration ceases, a corresponding amount of fluid will be drawn into the lower cavity; if this process be repeated sufficiently, the cavity will be completely filled. To apply this process to the sinuses, the patient lies on the back with the head extended so that the chin is vertically over the external auditory meatus, two cubic centimetres of the fluid are introduced into one nostril and the other firmly closed, while the patient breathes through the open mouth to raise the palate. Intermittent suction is then applied for three minutes by means of a rubber ball and a closely fitting nozzle, to which Dr. Le Mée has added a manometer; the negative pressure should be equal to 180 mm. of mercury. The skiagrams are taken immediately in an erect posture, and the method is of value in revealing thickening and abnormalities of the mucous membrane as well as anatomical aberrations. The sphenoidal and posterior ethmoidal sinuses are the more easily filled by this method but, in any sinus which is infected, occlusion of the ostium may prevent entrance of the fluid; in the opinion of Le Mée and Bouchet, the non-entry of lipiodol shows that the sinus is severely affected and must be treated surgically and, on the other hand, every sinus which admits the entrance of the fluid has a good prospect of recovery and should not be submitted to operation, even though the usual rules would appear to indicate it. They lay great stress on the value of this sign, which it would be interesting to see confirmed in other quarters. The time of evacuation of a sinus may also be studied by this method; according to these authors, half the liquid has normally disappeared in 24 hours, two-thirds by the following day, and no trace remains after four days. For treatment they claim good results from a 1 per cent. solution of argyrol; the method is very applicable to children in whom the sinuses are small but their ostia large, and it is especially useful in the treatment of the posterior sinuses, which are the more easily reached, in contradistinction to other methods by which these cavities are particularly inaccessible.

PHYSICAL SIGNS OF BUNDLE-BRANCH BLOCK.

IF there are physical signs of bundle-branch block which may be elicited by ordinary clinical methods and without the aid of the electrocardiograph, these will obviously be of value. Attempts have been made to establish a connexion between this condition and certain signs discoverable at or near the cardiac apex on inspection palpation and auscultation, but the relation can hardly yet be considered proved. Dr. Maurice Campbell and Dr. S. S. Suzman in our last issue reported the case of a patient with hypertension, paroxysmal dyspnœa, bundle-branch block, and gallop rhythm. At a later date both the block and the gallop rhythm had disappeared. However, both block of this type and gallop rhythm are common findings in a heart whose reserve is seriously impaired, and the two signs may occur independently of one another. They may arise from a common cause—namely, the functional insufficiency of the heart muscle. Moreover, the commoner form of gallop rhythm is produced by the addition in early diastole of a third heart sound, while if bundle block be a cause of gallop rhythm one would expect the third sound to be located in early systole. In Campbell and Suzman's case the electrocardiogram, taken after the disappearance of the characteristic bundle-block curve, presents changes which have been repeatedly observed to precede, and in the event of its disappearance, to succeed bundle-branch block. These consist of a well developed ventricular predominance, with a tall R wave and inverted T wave in lead I. This picture has usually been taken as indicating a severe degree of ventricular predominance, but from its frequent appearance as a stage in the development or recession of bundle-branch block, is considered by some to represent a mild grade of this form of block. J. T. King and D. McEachern [1] are of opinion that bundle-branch block can usually be recognised from physical signs. They find, in a series of 50 cases, a visible and palpable reduplication of the apex-beat in about 80 per cent. and a reduplication of the first sound in about 50 per cent. They have demonstrated a bifid apex-beat by photographing the movements of a straw attached to the apex directly on to a plate—a method which we owe to Parkinson—an electrocardiogram being taken at the same time. These tracings carry conviction, and it may be that with the cultivation of clinical technique a new sign of some value may be elicited by inspection and palpation of the cardiac apex.

MANIPULATIVE SURGERY.

THE medical profession on the whole is broad-minded and does not shrink from acquiring information from any source provided that source can produce scientific evidence for its contentions. The practices of bone-setters have aroused the enthusiasm of certain sections of the public, who are unwearied in twitting medical men for refusing to learn from them. But what the public does not wholly realise is that there exist within the ranks of the profession orthopædic surgeons who make a special and profound study of bone and joint diseases, who are well versed in the presumed mysteries of manipulative treatment and who, on account of their better training, more varied experience, wider outlook, and greater facilities do, in fact, practise bone-setting better and more safely than bone-setters themselves. The reason why, in spite of the existence of orthopædic specialists, unqualified practitioners continue to thrive, is because orthopædic surgery has only comparatively recently become recognised as an important specialty; so that a large proportion of general practitioners have not had the advantage of serving their apprenticeship in the orthopædic department of their teaching hospital during their student days. These practitioners are apt not to recognise cases that would benefit by manipulation, and the patients are obliged to take the treatment in their own hands, when they seek the advice of bone-setters, whose services can be advertised in the lay press in a way that is not open to registered doctors. The remedy for this state of affairs will come only when every student is obliged to serve as dresser in an orthopædic department before being allowed to sit for any qualifying examination. Practitioners who have missed this valuable experience need not, however, remain without expert guidance in this branch of orthopædics. Some seven years ago we had occasion to notice favourably a book on Manipulative Surgery, by Mr. Timbrell Fisher,[2] and on another page of this issue will be found an appreciation of a recent work by Mr. Blundell Bankart on the same subject. Such books are useful, for it is necessary to emphasise more strongly than has hitherto been done that orthopædics as a specialty is concerned not only with the prevention and

[1] Amer. Jour. Med. Sci., April, 1932, p. 445.
[2] THE LANCET, 1925, ii., 1286.

correction of deformities, but also with the art and practice of moving joints for therapeutic purposes. Orthopædic surgeons have acquired, in addition to manipulative skill, a training in differential diagnosis founded on a knowledge of general as well as regional pathology, and a patient who seeks help from a qualified man has all the resources of surgery at his disposal should manipulation be deemed unsuitable, or be unsuccessful in effecting a cure.

A ROOM OF ONE'S OWN.

THE London County Council are developing a nursing service which already includes between 9000 and 10,000 women, and is likely to grow even larger in the future. Among the advantages offered to an entrant to this service are that, within its bounds—that is, without loss of pension rights—experience may be gained in practically any branch of nursing, except perhaps private nursing, and that it is a definite policy of the Council to encourage interchange and promotion between various hospitals and departments. Moreover, a uniform scale of salaries has been devised; the hours of work have been reduced to 56 a week day duty, including a period for lectures, and the aim is to reduce them to 54 a week as soon as practicable; and one weekly rest day in seven is assured. In some of the L.C.C. hospitals the trained staff nurse who prefers to live out has an opportunity of doing so, her initial salary of £65 a year, including board while on duty, being supplemented by a living-out allowance of £90; sisters receive an initial salary of £90, including board while on duty, with non-resident allowance of £130. THE LANCET Commission on Nursing recorded evidence that the innovation was regarded as most successful by the authorities, and we learn that 500 of the trained nursing staff now live out. It is patently the aim of the Council to provide a standard of teaching, accommodation, personal freedom, and amenities which compares favourably with that provided at most voluntary hospitals. The immense task of coördinating the practice at seventy-odd hospitals, some of which fell under the administration of the central public health committee of the Council only two years ago, has been tackled with great vigour, and it was inevitable that inequalities should continue to exist for a time. Accommodation has been one of the most difficult problems, since in the interests of the patients and of the nurses themselves it was decided to enlist the services of 500 extra nurses and probationers. An illustrated pamphlet, issued early last year in order to stimulate recruitment, contained the statement that "the L.C.C. nurse has, from her first day as probationer, a comfortably furnished room of her own." It was evidently the intention of the Council that this should be true before the pamphlet was issued, but though 3664 probationers (81 per cent.) do have single rooms, 215 still occupy wooden cubicles, 92 curtain cubicles, and 529 share a bedroom. Following a complaint by a probationer, who left a hospital after only four days, Miss Esther Rickards, F.R.C.S., drew the attention of the Council to the inaccuracy of the pamphlet in this respect, and it has now been withdrawn. The protests from nurses which her action has aroused have been unmerited. At a meeting of the London and National Society for Women's Service held on May 5th to discuss the Final Report of THE LANCET Commission on Nursing, Miss Rickards took an opportunity of disclaiming any intention to do harm to the nursing service of the L.C.C., for which she had a great admiration. The resentment expressed in a letter from the nursing staff of the hospital in question to the chairman of the central public health committee of the L.C.C. is a good example of the attitude of nurses already acclimatised to the aspirations of newcomers, which may sometimes stand in the way of desirable reforms. Some of them, so they say, preferred curtained cubicles to private rooms, were loth to leave them, and so forth. All this, and the fact that the probationer did not remain in the hospital long enough to appreciate the many advantages offered, are irrelevant. The accommodation supplied was not that promised, and the chief lesson to be learnt from the episode is the danger of premature propaganda.

THE VEGETATIVE NERVOUS CENTRES.

THE possible situation of the centres controlling vegetative activities—to which we referred on April 16th—is considered in greater detail by E. A. Spiegel[1] and by J. Beattie.[2] Spiegel indicates the difficulties encountered in attempting experimentally to demonstrate a functional rapport between a given organ and any definite area in the brain. The chief difficulty lies in the fact that visceral, as opposed to somatic, activity is largely independent of central nervous control and is normally a matter of more local reflexes. Consequently, experimental lesions of the afferent or efferent nervous connexions of the viscera rarely produce dramatic changes in function. Even when changes do take place it is not easy to be sure that they are not indirect consequences of altered activity of the endocrine glands. Spiegel also points out that the various vegetative nuclei are by no means sharply distinct from one another. He concedes, however, that the hypothalamics may be divided into two parts, the one controlling the pituitary gland, the other supplying the viscera via the spinal cord. Beattie, on the other hand, is more explicit. He recognised three anatomical subdivisions of the vegetative centre: an anterior or supra-optic nucleus, situated directly above the optic chiasma and bounded in front by the anterior commissure and behind by the pituitary stalk; the intermediate tuber cinereum surrounding like a collar the infundibular recess; and a posterior nucleus spread out over the lateral wall of the third ventricle behind the middle commissure and extending downwards to the mamillary body. Of these nuclei he believes that the posterior controls sympathetic and the anterior parasympathetic activities. In addition to the connexions mentioned above, the nuclei receive afferent fibres from the olfactory areas and the optic thalamus, and send efferent fibres to the intermediate and posterior lobes of the pituitary gland. The close functional relationship between the latter gland and the hypothalamus (the "neuro-hypophyseal mechanism" of Cushing) is also illustrated by the observation of Popa and Fielding[3] that a part of the blood draining the pituitary is diverted, as a "portal" network, to irrigate the adjacent hypothalamus.

The charting of the hypothalamus and the assessment of its rôle in metabolic and visceral activity form a problem of considerable importance. Its solution should entail a coöperation between the neurologist and the "internist" (to borrow a useful American term) which should be to the advantage of both.

[1] Bull. Johns Hopkins Hosp., April, 1932, p. 237.
[2] Canad. Med. Assoc. Jour., April, 1932, p. 400.
[3] Jour. Anat., 1930, lxv., 88.

THE HUGHLINGS JACKSON MEMORIAL MEDAL.

ON May 19th, the occasion being the annual meeting of the Section of Neurology of the Royal Society of Medicine, a gold medal and an honorarium of 100 guineas will be formally presented to Sir Charles Sherrington, F.R.S., the Hughlings Jackson lecturer for 1931. The medal, of which the obverse is reproduced here, was designed by Mr. Percy Metcalfe from a photograph published in *Brain* in 1906. The ceremony marks the completion of the task undertaken early last year, on the initiative of Mr. Leslie Paton, of collecting a memorial fund to endow this lectureship, which is held every three years. Dr. Wilfred Harris became the energetic treasurer of the fund, and the required sum of £1200 was collected from 146 subscribers at home and abroad. Dr. Harris has added to the interest of the ceremony by preparing a pamphlet in which he gives some account of Jackson and his times, and of the development of journals and societies devoted to the study of neurology. Hughlings Jackson was one of the four original editors of *Brain*, which was started in 1875 as an independent journal. Twelve years later it became the journal of the recently formed Neurological Society of London, and the association continued until 1907, when this society, which had already enlarged its title and scope, amalgamated with others to form the Royal Society of Medicine. *Brain* then resumed an independent existence. The most attractive feature of the pamphlet is the vivid description of Hughlings Jackson, under whom Dr. Harris served as house physician at the National Hospital in 1896. "A gentle soul, unbelievably modest, with a fund of quiet humour," Jackson took no exercise, nor cared for outdoor sports, but liked detective stories. Many will sympathise with his reply to Jonathan Hutchinson's effort to get him away from one for a walk on a "beautiful day" in winter. "It's a beautiful day by the fire," said Jackson, as he settled closer in his easy chair. Jackson, who died in 1911, had never published any comprehensive text-book on neurology, but was a prolific writer of essays and papers, some of which have recently been collected by Dr. James Taylor into two volumes of "Selected Writings." The lectureship was founded in 1897, when Hughlings Jackson himself inaugurated it in an address on the relations of different divisions of the central nervous system, which was published in full in THE LANCET (1898, i., 79). It is proper that a lectureship "in honour of the discoverer of cortical epilepsy and its relation to cerebral localisation" should be suitably endowed, and that the first recipient of the medal should be one who has done so much to elucidate the physiology of the central nervous system.

HUGHLINGS JACKSON MEMORIAL MEDAL.

THE MEDICAL ANNUAL.

WITH the 1932 volume [1] the Medical Annual has attained its fiftieth year of issue, and the jubilee number contains a list of contributors, totalling 201, from 1884 to 1932, with their portraits. The Annual was started in London, but two years later was transferred to its present publisher in Bristol and came under the editorship of the late Dr. Percy Wilde, whose vigorous and inquiring mind gave the Annual a spirit of enterprise which it has never since lacked. The present joint editors, Dr. Carey Coombs and Mr. Rendle Short, speak of Wilde's devotion as almost fanatical in its fervour, the production of the Annual offering him an opportunity of service to the medical profession and to humanity which was welcomed both by himself and by Mr. Hartland Wright, a partner in Messrs. John Wright and Sons, who is still living in retirement. The Annual has been generally regarded as a work of reference, although once or twice in its preface has appeared the suggestion, true no doubt but difficult to realise, that the purchaser would do well to read the volume from beginning to end. To make reference easier there have appeared a series of synoptical indexes with special headings for remedies and diseases, giving the practitioner a rapid means of acquainting himself with essential points and to some extent a connected story of the progress of treatment over a period of years. The jubilee volume differs only from its predecessors in being rather larger than usual, due to illustrations, though these have always been a strong feature. There are contributions on veterinary surgery, as the editors believe that both human and veterinary medicine will gain from a wider knowledge of both spheres of work. For practitioners overseas and in rural practice has been inserted some detailed discussion of the causes and treatment of dental pain. In every department of medicine the review of the year's work has been kept up to date. The supplement contains an index of new inventions and preparations, a list of books of the year, and a useful directory of sanatoriums, spas, nursing homes, and other institutions.

THE USE OF MAGGOTS IN INFECTED WOUNDS.

FROM time to time it has been noticed that wounds contaminated with maggots have shown rapid healing. This observation was again made by W. S. Baer during the late war, and ten years later by animal and clinical investigation he attempted to put the use of maggots on a scientific basis as a method of treatment.[2] S. K. Livingston,[3] who formerly worked with Baer, has continued his inquiries, and relates how by means of an incubator he breeds the flies continuously during summer and winter. The eggs are sterilised in perchloride of mercury and alcohol, and are then placed on sterile agar and beef slopes in test-tubes where the maggots hatch out, the latter are also bathed in the antiseptic solution before use. Of 100 cases treated, 90 of which were cases of chronic pyogenic osteomyelitis, 95 per cent. healed. In a second paper Livingston with L. H. Prince [4] describe a series of 200 cases in adults, the

[1] The Medical Annual: A Year Book of Treatment and Practitioner's Index. Fiftieth Year. 1932. Bristol: John Wright and Sons, Ltd.; London: Simpkin, Marshall, Ltd. Pp. 674. 20s.

[2] See THE LANCET, 1930, ii., 1301; 1931, i., 280.

[3] Surg., Gyn., and Obst., April, 1932, p. 702.

[4] Jour. Amer. Med. Assoc., April 2nd, p. 1143.

first 100 apparently being those already mentioned. The second 100 cases consisted of chronic infective bone conditions, and healing was obtained in 88 per cent. A third paper, by E. H. Wilson, C. A. Doan, and D. F. Miller,[5] deals with 26 cases of osteomyelitis, in 19 adults and 7 children, and includes one case of acute osteomyelitis; healing was obtained in 22 cases. It must be pointed out that the maggot treatment is preceded by a radical sequestrectomy with the institution of free drainage and the use of vaccine during treatment. The wound is packed for 48 hours after the operation, and then the maggots are introduced; redressing is required every third to fifth day with the introduction of fresh maggots. Unless drainage is free the maggots may be drowned in the pus. As to the mode of action there are said to be various factors—namely, the ingestion of bacteria and necrotic material, stimulation of the outpouring of blood-serum and the production of an "active principle," which can be obtained by grinding live maggots in sterile saline solution and filtering through Berkefeld filters. Livingston and Prince use this active principle for dressing when the wound has been cleaned up by maggots; they are now also using this substance combined with vaccine therapy in the treatment of chronic leg ulcers, sinus and mastoid infections, and middle-ear disease.

STRUCTURE OF ATOMIC NUCLEI.

AT a meeting of the Royal Society held on April 28th Lord Rutherford gave a masterly review of the physics of the atomic nucleus on which light has recently been thrown by work done under his direction at the Cavendish Laboratories in Cambridge. The picture of an atomic nucleus generally accepted to-day is a massive aggregate or group of alpha particles with a few free electrons and protons. The alpha particle is a helium atom carrying a positive charge, whilst the more familiar electron is the minute unit of negative electricity. The proton is the name given to the nucleus of the hydrogen atom which is a positive charge having a mass of unity in the atomic number scale. The nucleus is surrounded and held together by a barrier of high positive potential which implies an intense field of electrical force. But these simple mechanical concepts are regarded to-day only as useful simplifications for further research. When the model fails to explain all the observed facts, it does not mean that it is forthwith scrapped. The lesson of relativity and wave mechanics has been one of humility. Physicists no longer demand that a theory shall fit everywhere. So long as it holds over even a limited range it is too valuable to abandon. Lord Rutherford emphasised this in his use of the word picture. The barrier of positive potential is so efficient that any particle must have a high velocity in order to penetrate or shatter the atomic nucleus. Conversely any escaping particles, as for example, the alpha and beta radiation of the spontaneously decomposing radio-active elements, must also have a high velocity to penetrate this barrier. In general two lines of attack on the problem of the nucleus may be distinguished. There is first the method of penetrating the nucleus by an atomic projectile. Secondly, there is the study of what comes out, either as particles or as radiation, and the deduction from such observations of the nature of the source. Examination of the band spectra of the lighter elements has yielded evidence in the nucleus of what has been termed spin. The experiments involve the analysis of the fine detail in the spectra, and mathematical treatment of the series of frequencies found. In the method of nuclear penetration by rapidly moving particles there exists one great experimental difficulty which is inherent in the actual structure of matter. About 12 years ago Lord Rutherford bombarded nitrogen with high speed alpha particles. He obtained definite evidence that when a nitrogen nucleus was hit the atom was disrupted. To obtain this result a very large number of alpha particles was needed, as the number of direct hits was very small compared with the misses. This is due to the open structure of the atom. The nucleus is surrounded by its attendant electrons, which revolve at what is relatively a large distance, so that there is ample room for the flying particle to miss the target of the minute nucleus. The bombardment must therefore be in the nature of a general barrage, since aiming of atomic bullets is out of the question.

In his address Lord Rutherford made a preliminary announcement of the results obtained at Cambridge by J. D. Cockcroft and E. T. S. Walton by a new development of this method. The projectiles used were in this case protons, obtained from an electrical discharge through hydrogen and driven by a potential of 200,000 to 800,000 volts. This high positive potential acts on the positive charge of each proton, giving it a velocity of above 10^9 cm. per second. The jet of protons was allowed to fall on a plate of lithium inclined at an angle of 45°, when it was found that alpha particles began to be shot off from the lithium after the velocity exceeded a certain value. The alpha particles were detected by the tiny flash of light produced on striking a screen of willimite. Their number could be ascertained by a form of the Geiger counter. The explanation given of the effect was that each flash represented the explosion of a lithium atom of mass 7 hit by a proton of mass 1, the result being apparently the production of two alpha particles of mass 4. Other elements are now being examined by this method. This is, of course, not the first time the atom has been split, as the original work of Rutherford has the prior claim to that distinction. At the same meeting J. Chadwick described the steps which led him to identify the existence of the neutron, whose particles carry no effective charge, but have a mass of about unity. They are composed, it is believed, of a proton and electron in such close association that no external field is to be detected. A moving neutron does not produce ions as it flies unless a direct hit is registered. The discovery of the projection of the neutron from the atom of beryllium on bombardment is due to Mme. Curie-Joliot and M. Joliot, and has afforded not only new evidence of the nuclear structure, but has given a new experimental weapon for further research. Dr. Chadwick showed the tracks of the atomic disturbances produced by the impact of a neutron, the photographs being obtained by producing the collisions in a gas super-saturated with moisture, when the water condenses on the ions produced and shows as a track of minute droplets. It is a matter for a justifiable national pride that in all this work the Cavendish Laboratories may be said to have set the pace.

Dr. James Collier will deliver the Morison lectures before the Royal College of Physicians of Edinburgh, at 5 P.M., on Monday, Tuesday, and Wednesday, May 23rd to 25th. His subject will be the Pathology and Clinical Features of Some Types of Peripheral Neuritis.

[5] Jour. Amer. Med. Assoc., April 2nd, p. 1149.

SPECIAL ARTICLES

EXPERIMENTALLY PRODUCED MALARIA.

ALTHOUGH malaria is by far the most common disease in the tropics, if not the most widespread pestilence of mankind, it is only during recent years that really accurate knowledge of it, based on controlled experiments, has been obtained. For the fullest account of experimental malignant tertian malaria that has yet appeared we are indebted especially to the efforts of Colonel S. P. James, F.R.S., and his colleagues at Horton Mental Hospital, Epsom. Their latest work was described in a paper by Colonel James, Dr. W. D. Nicol, and Mr. P. G. Shute, read before the Section of Tropical Diseases of the Royal Society of Medicine, on May 5th.

For the treatment of general paralysis it was at first the practice to use strains of the benign tertian or quartan parasite and, on account of the supposed risks, artificial inoculation with *Plasmodium falciparum* was avoided. At Horton, as experience increased and laboratory organisation developed, it became possible, however, to safeguard against these risks, and from August, 1927, malariotherapy with *P. falciparum* was tentatively used for patients who had not greatly benefited from a course induced by one or other of the "benign" parasites. Since no untoward events followed in the first series of cases, the trial was gradually extended to include patients not previously infected with any form of malaria. Although in the first 22 cases there were two fatalities during or shortly after the malarial course, more than 50 have since been treated without a death, so that the death-rate attributable to a malaria course with *P. falciparum* at Horton is only 4 per cent.—i.e., less than half that of treatment with the benign tertian parasite in mental hospitals in England and Wales (10–14 per cent.).

Eight strains of the parasite were used, two from India, three from Rome, one from Sardinia, and two from West Africa. Some patients were infected by blood inoculation, others by the bites of mosquitoes, while two developed the fever some ten days after being injected intravenously with sporozoites from the salivary glands of infected mosquitoes.

The important question is now raised as to whether there is more than one species of the malignant (crescent-forming) parasite, for Colonel James and his colleagues have found within the same species various geographical races which, while not morphologically different, can be recognised as distinct by their clinical virulence, immunological reactions, and other biological properties. The most virulent infections appeared to be those caused by strains from Rome and Sardinia; moreover, it proved possible to reinfect patients with these strains after they had been rendered immune to strains of Indian origin. A still more significant fact is that English *Anopheles maculipennis* could not be infected by Indian strains of *P. falciparum*, whereas it was quite easy to infect them with European strains from Rome and Sardinia.

The actual artificial reproduction of blackwater fever under these experimental conditions must be adjudged a clinical observation of the first importance. Two patients infected with the Rome-Sardinia strains developed blackwater fever, while a third very nearly did so. No occurrence of this sort was noted with the Indian strain. Very conclusive evidence was also obtained that quinine was the exciting cause of the blackwater attacks, and at the same time it was noted that the severity of the repeated relapses preceding the actual attack was to be considered the antecedent cause.

CHARACTERISTICS OF MALIGNANT TERTIAN INFECTION.

The investigations have included an analysis of the temperature curve during each febrile paroxysm, and they confirm the classical observations of Marchiafava and Bignami as to the existence of definite febrile paroxysm giving a characteristic temperature curve generally exceeding 24, and often lasting 36 or 40 hours. Colonel James and Dr. Nicol see no reason to suppose that there is a form of this parasite which completes its asexual cycle in 24 hours, and therefore produces a malignant quotidian type of fever. And in this matter they have had the advantage, not enjoyed by previous workers, of working with patients who have never before been infected with malignant malaria and who have remained under observation continuously for a year or more.

The general course of the disease in malignant malaria is deduced from a study of 25 cases under continuous observation for over a year after the primary attack, so that it has been possible to summarise the differences between this and the benign tertian. The main points of distinction are as follows: Although in most cases of malignant tertian malaria the infection ceases to recrudesce within two months of recovery from the primary attack, it sometimes continues to do so for a longer period; thus the period of recrudescences merges, without a well-defined break, into what is called in benign tertian malaria "the period of relapse." But Colonel James definitely states that, although some of the seven mosquito-infected patients under observation for over a year since their recovery from the primary attack had many recrudescences during the first six months, none subsequently showed a relapse or recurrence such as is common in benign tertian malaria. Malignant tertian malaria also differs in that no apparent difference can be detected between the disease caused by direct blood inoculation and that produced by the bites of infected mosquitoes. Moreover, quinine treatment of the primary attack brings about a permanent cure in less than 20 per cent. of cases of malignant tertian malaria as compared with 50 per cent. for the benign tertian. Clinically, malignant tertian malaria is an acute disease consisting of a severe primary attack followed by several less severe recrudescences at relatively short intervals, and in this respect it differs from the benign tertian which is essentially a chronic disease. The difference is so marked that it can be said definitely that only in the primary attack is there a grave risk of pernicious symptoms; but it must be understood that in this statement blackwater fever is excluded, for this is a manifestation not associated with abundance of parasites and their active sporulation, as are the other pernicious complications. The parasitic infestation is greatest in the primary attack but also diminishes in each recrudescence.

TREATMENT.

The following conditions have been found to influence the therapeutic effect of quinine on the clinical and parasitological course of malaria: the

mode and dose of infection, the natural susceptibility and resistance to malaria of the patient, the degree of tolerance or "immunity" to malaria which he has acquired before treatment, the species of parasite, and the virulence of the particular geographical race. The conclusion is reached that the usual clinical practice of administering quinine in malignant tertian malaria may not always be in the best interests of the patient. It is often stated that malignant malaria is easier to treat in hospitals in England than in the tropics, but this is because the fever here represents a recrudescence and not a primary attack, so that the patient has already acquired a certain amount of immunity to this particular infection. The failure of Colonel James and his colleagues to get good results with the "Sinton treatment" (quinine plus alkali) is probably also due to the same cause. From the point of view of economy, the importance of prescribing a separate system for each parasite rather than a standard system applicable to all has become much greater since the discovery of *Plasmodium ovale*. Even in primary infections with this parasite the tendency to spontaneous recovery is so marked that it is hardly ever necessary to give more than two small doses of quinine. The new observations on the individuality of different strains of the same species of parasite introduces a new difficulty in the chemotherapeutic tests. A report of highly successful results with new antimalarial preparations would be valueless, unless it were shown that the cases could not be so successfully cured by a few small doses of quinine. From all the information obtained one is apparently justified in withholding quinine for a short period in order to ascertain by frequent blood examinations and clinical investigations whether the parasitic infestation and signs and symptoms are diminishing "spontaneously" or becoming more pronounced.

Colonel James and Dr. Nicol think that the curative effect of Atebrin [1] is very remarkable and that its discovery marks a new epoch in the therapeutics of malignant tertian malaria. This statement is especially significant when it is understood that the experiments were arranged with the view of eliminating errors in chemotherapeutic trials caused by the influences already described. The first trials were made on four cases of malignant tertian malaria which had continued to relapse for more than six months after their primary attacks, and also on patients who were not cured by quinine treatment during the primary fever. The dose of atebrin was 0·3 g. daily (in tablets) for five days. In only one of the 17 cases treated with atebrin did the remedy fail to effect what appears to be a permanent cure.

The action of atebrin, as has already been stated, seems in many ways to be the reverse of that of plasmoquine, for it appears that atebrin will be of little use as a malaria prophylactic.

It is fitting that an interesting instance of plasmoquine prophylaxis should be recorded in the case of Mr. J. Y. Brown, European inspector of the public health department of Nigeria, who in bringing home to England a batch of *Anopheles gambiæ* heavily infected with the sporozoites of malignant tertian malaria, allowed these insects to feed frequently on his own blood whilst taking 0·06 g. of plasmoquine daily as a prophylactic, and the same dose daily for eight days after the last occasion on which he was bitten. Though the patients injected with the sporozoites developed acute malignant tertian malaria, Mr. Brown has remained in his usual good health for more than three months after the last occasion on which he was bitten.

There is little doubt that the facts recorded above mark an advance in our knowledge of this most intricate subject, and fully justify the pains that Colonel James and his colleagues are taking.

[1] See THE LANCET, April 9th, p. 796; April 16th, pp. 826, 847.

SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

EDINBURGH HOSPITALS SCHEME.

BY 41 votes to 13, the Edinburgh hospitals scheme for paying patients has been approved. It is expected that there will be a revenue of £6000 per annum in respect of the three hospitals concerned—Pilton, Craigleith, and Seafield. The convener of the public health committee indicated that no case would be turned away on account of inability to pay, but if anyone responsible for the patient could pay, he would be required to do so. The amount would depend upon the circumstances of the case and might, for example, be as low as 2*s*. 6*d*. a week. This would not be a profit basis. She quoted many instances outside the poor-law where a charge was made for the services given by the corporation—such as baths, washhouses, bowling-greens, and golf courses. The charge made in these cases was not an economic or commercial charge, and the same thing would hold for the municipal hospitals. The scheme would undoubtedly throw a considerable burden on the rates, and the charge made—except to other local authorities for their patients—would in no sense represent the money value of the services, maintenance, and treatment, which the patients would receive. There was a proposal that treatment should be free all round, but the vote was as above. It is assumed that the scheme is now ready for submission to the Department of Health.

NEUROSYPHILIS.

Before the Edinburgh Medical Chirurgical Society on May 4th Dr. David Lees, assisted by Mr. Robert Lees, gave an analysis of 613 cases of neurosyphilis encountered at the Edinburgh clinic during the 12 years of its work. They represent about 4·6 per cent. of the total of some 14,000 cases treated. The proportions of the different varieties are very striking, the percentages of incidence being as follows. Tabes: males, 55·8; females, 47·9. G.P.I.: males, 19·5; females, 19·5. Tabo-paresis: males, 8·6; females, 2·4. Vascular: males, 5·6; females, 6·5. Meningo-vascular: males, 7·4; females, 6·5. Latent cerebro-spinal syphilis: males, 2; females, 13. Gumma: males, 1·2; females, 0·0. Eighth nerve paralysis: males, 0·0; females, 0·0. Optic atrophy: males, 0·0; females, 4·1. For congenital cases, without distinction of sex, the percentages in the same sequence were 26·6, 31·4, 31·8, 1·9, 10·5, 8·5, 0·9, 12·4, 3·8. Of the total 613 cases, males were 55·6 per cent.; females, 27·6; "congenitals," 17·1.

The most striking features are the high percentage of tabes both in males and in females. Contrary to expectation, the incidence of G.P.I. in this series is the same in females as in males; the ratio usually given is nine males to two females. In congenital syphilis there was a high percentage (12·4) for eighth nerve paralysis. Optic atrophy yielded 4·1 per cent. for females and 3·8 per cent. for congenitals. Discussing the question whether early treatment adversely affected the incidence (later) of neurosyphilis Dr. Lees concluded that it did not.

WORK FOR THE BLIND.

Dr. George Mackay has been for 31 years oculist to the Edinburgh Asylum and School for the Blind,

and has established a very exacting system of examination and record. His last report points out that in diagnosis he has often experienced difficulty because of the inadequency or inaccuracy of the history given on the schedules sent in by the applicants or their guardians. Many of the medical men who fill up the medical part of the schedules have never had an opportunity of treating the cases in the early stages, and therefore depended on hearsay. Even an expert ophthalmic surgeon may be at a loss to classify correctly the original state, and primary and secondary causes which might have reduced an eye, or a pair of eyes, to the state of disorganisation in which they came seeking for blind benefits.

Dr. Mackay has lived through the whole period during which the treatment of eyesight has passed from pure empiricism to systematic examination in institutions. So far back as 1890, in a public lecture he urged the desirability of inquiring into the physical condition of every school-child, including the state of the eyes and eyesight. His suggestion appeared at the time somewhat Utopian, and it was not until 1904 that the first systematic examination of the eyesight of school-children in Edinburgh was undertaken by his clinical assistant at the request of the investigator appointed by the Royal Commission on Physical Training (Scotland). In 1908 the Education (Scotland) Act of that year empowered the Scottish Education Department to require local education authorities to make a medical examination of school-children. The eye clinic of the Edinburgh school board was started in 1912. Still later, the introduction of schemes for maternity and child welfare had assured the early recognition of defective eyesight in very young children. And now the latest development of all has come about by the establishment of clinics, officered by expert ophthalmic surgeons, through whose certificates alone the benefits of the Blind Persons Act, 1920, can be obtained. Dr. Mackay has had a hand in these and other movements, and the Scottish administrators have appreciated to the full the value of his services.

IRELAND.

(FROM OUR OWN CORRESPONDENT.)

SUGGESTED TAX ON THE SWEEPSTAKES.

ACCORDING to newspaper reports, in advance of the introduction of the Budget of the Irish Free State, it is expected that the Minister for Finance will make a raid on the sweepstakes. A special tax —some say 5 per cent., others 10 or even 15 per cent.—is to be put on the total receipts for tickets. If one may regard the figures for 1931 as representative, a tax of 5 per cent. on total receipts would bring to the national exchequer some £450,000. It is believed by those interested in the success of the sweepstakes that a tax of this kind—whatever percentage might be fixed—would have a very depressing effect on the sale of tickets. Foreign purchasers, and they have always been the majority, would, it is thought, resent being asked to pay Irish taxes, however willing they may have been to contribute to the relief of Irish charities. It is thought by many that the hospitals would benefit more if the Government were to content themselves with removing the present exemption from income-tax enjoyed by the hospitals in regard to the sums they receive from the sweepstakes, and drop the proposal of a direct tax.

INCOME-TAX ASSESSMENT ON A HOSPITAL.

An important decision was given by the High Court of the Irish Free State (Mr. Justice Sullivan, Mr. Justice Hanna, and Mr. Justice O'Byrne) last week on an appeal taken by the inspector of taxes against a decision of the Special Commissioners of income-tax in a case in which the inspector claimed that the profits arising from private nursing homes attached to a public hospital were liable to income-tax. The superioress of the Mater Misericordiæ Hospital, a public charitable institution, carried on in association with the hospital certain nursing homes in which patients are received for payment. She contended that they constituted an institution, that there was no such institution as the Mater Private Nursing Homes, that the hospital was not carried on on commercial lines, but on lines that rendered it impossible to make a profit; that a charitable institution was exempt from income-tax. The inspector contended that while the public hospital as a charitable institution was exempt, annual profits arose from the carrying on of private nursing homes, and that the superioress was properly chargeable with income-tax upon such annual profits. The Special Commissioners had found that the hospital was carried on as one undertaking, that no line of demarcation could be drawn between the profitable and the non-profitable part of the activities of the hospital, and they concluded that the superioress was not carrying on a trade, and that the assessment should be discharged. The High Court gave judgment in favour of the appellant, the inspector of taxes, and against the superioress of the hospital. The Court held that the Special Commissioners had misdirected themselves in law in holding that the concern was run as an undertaking, and that there was no financial demarcation between the profitables and the unprofitables. The proper question for the Commissioners to determine was whether the superioress did habitually during the tax year let for hire the rooms and beds, with private accommodation, board, nursing, and, in some cases, medical and surgical attendance. If the answer was in the affirmative, then she carried on a trade in the meaning of the Income-tax Acts. The case must be remitted to the Special Commissioners, each party to bear its own costs.

PARIS.

(FROM OUR OWN CORRESPONDENT.)

THE assassination of the President has plunged France into gloom: M. Paul Doumer was a strong calm man, whose wide knowledge of affairs will be particularly missed at this juncture.

SICKNESS INSURANCE AND DEATH-RATES.

Sickness insurance has only just been started in France as a whole. But the Departments recovered from Germany have enjoyed its benefits for about half a century. A comparison between the death-rates in these Departments and those in the rest of France should therefore give a rough idea of the value of such insurance. This task has just been undertaken by Dr. Mosser, of Mulhouse. In the *Revue Philanthropique* for April 15th, he refers to an earlier study in which he showed that in the period 1911–21, the death-rate for Alsace and Lorraine was 156 per 10,000 inhabitants, whereas for the whole of France it was 187. In a more

recent study he has found the death-rate for the period 1920–29 to be 143 for the three recovered Departments as compared with 173 for the whole of France. As the latter figure includes the three Departments, the difference between the two must be even greater than the above figures would suggest. In both statistics the Department of the Upper Rhine leads, and the Department of the Lower Rhine comes last, while the Moselle occupies an intermediate position. A comparison of the infant mortality in the recovered Departments with that of the whole of France tells the same tale; in the four-year period 1923–26 the former (Upper Rhine only) was 720 per 10,000 live births, while the latter was 919. In the same period and areas, the death-rates for persons over the age of 1 year were 125 and 157 respectively. Dr. Mosser examines the various factors such as climate, rural and industrial distribution of the population, &c., in the two areas which might possibly explain this consistent and striking difference in the death-rates, and he comes to the conclusion that it is to be found in the benefits of sickness insurance which provides the worker with all the best therapeutic devices of modern medical science and the service of specialists. He calculates that if France, as a whole, could reduce her death-rate to that of the Upper Rhine, there would be a saving of 130,000 lives a year. With the health conscience France is so vigorously cultivating at the present time, there is every prospect of her shortly attaining the goal to which Dr. Mosser points.

MEDICINE AND THE LAW.

Damages for Injured Doctor.

IT is the special function of a jury to assess the amount of damages in a common-law action. A new trial will be ordered on the ground of excessive damages only when the amount is greater than any jury would reasonably give—i.e., where the court can find no reasonable proportion between the amount awarded and the loss or injury sustained. In actions for personal injuries due to the defendant's negligence the jury, said Brett, J., in 1873, must not attempt to give damages to the full amount of a perfect compensation for the pecuniary injury, but must take a reasonable view of the case and give what they consider in all the circumstances of the case a fair compensation.

Early this month in Mr. Justice Swift's court a common jury awarded £5243 to Dr. Francis Joyce, of Camberwell-road, S.E., who had been knocked off his bicycle by the defendant's negligence. He received a lacerated wound from elbow to wrist; the ulnar nerve was torn, and the use of his hand in performing surgical operations would be affected. On the day after the trial the defendant's counsel applied for a stay of execution, pending appeal, on the ground that the damages were grossly excessive. Mr. Justice Swift said he did not think the amount was at all excessive in the case of a professional man whose practice depended entirely on his skill with his hands and the appearance which he presented with his hands. The judge refused to stay execution except upon terms that Dr. Joyce should be paid £2500 at once, not to be recoverable in any event, that the balance of £2743 should be paid into court to abide the decision of the Court of Appeal, and that notice of appeal be given and appeal entered within seven days. These terms were, however, varied last Tuesday by order of the Court of Appeal; the sum to be paid forthwith to Dr. Joyce was reduced to £500, the balance to be paid into court within 14 days and costs to be taxed and paid to him on the undertaking to return them if an appeal succeeds. If anybody thinks £5000 a little too much, many may think £500 much too little; it will be interesting to see what principle the appellate tribunal establishes in the event of appeal.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE.

Surg. Rear-Admiral W. W. Keir has been appointed to the charge of the R.N. Hospital, Haslar, vice Surg. Rear-Admiral H. C. Whiteside.

The following appts. are notified: Surg. Lt.-Comdr. (D) O. J. Barrable to *Victory*, for R.N. Barracks. Surg. Lts. (D) R. W. Stevens to *Resource*, and J. C. Benson to *Ganges*.

ROYAL ARMY MEDICAL CORPS.

Maj. J. H. Baird retires on retd. pay.

MILITIA.

Maj. J. B. Williamson retires on attaining the age limit and retains the rank of Maj.

TERRITORIAL ARMY.

Maj. G. A. Bridge, R.A.M.C., to be Divl. Adjt., 42nd (E. Lan.) Div. & Sch. of Instn., vice Capt. F. C. Hilton-Serjeant, R.A.M.C., vacated.

I. Mackintosh (late Lt. Malay States Vol. Corps) to be Lt.

ROYAL AIR FORCE.

The undermentioned are granted short service commissions as Flying Officers for three years on the active list: O. S. M. Williams, T. A. Hunt, and H. J. Melville.

Flying Officer V. H. Tompkins ceases to be seconded to the General Infirmary, Leeds.

Squadron Leader R. E. Bell is placed on the retired list at his own request.

Dental Branch.—J. E. Willoughby is granted a non-permanent commission as a Flying Officer.

DEATHS IN THE SERVICES.

Major-General Bruce Morland Skinner, C.B., C.M.G., M.V.O., an old St. George's man who qualified in 1879, died at Colchester, aged 74. He entered the Army Medical Service in 1882, and subsequently served on the North-West Frontier of India (medal with clasp). In the South African war of 1899–1901 he was present at the relief of Kimberley, and at the battles of Paardeberg, Poplar Grove, and Driefontein (despatches, Queen's medal with five clasps). He was made M.V.O. in 1906, and in 1910 was appointed honorary surgeon to the Viceroy of India. For a time he acted as secretary of the Advisory and Nursing Boards at the War Office, and was afterwards Commandant and Director of Studies at the Royal Army Medical College. During the European war (mentioned in despatches five times, C.M.G. and C.B.) he was director, after Deputy Inspector, of Medical Services. He retired in 1917, and in the following year received the honorary rank of major-general.

The name of Maj. H. C. Godding, R.A.M.C., has been brought to notice by His Excellency, General Sir Philip Chetwode, Commander-in-Chief in India, for distinguished services rendered in connexion with military operations on the North-West Frontier of India, during the period October, 1930, to March, 1931.

DONATIONS AND BEQUESTS.—Among other bequests the late Mrs. Florence A. Oldham, of Birchington, left by will on the death of her husband £1000 each to the Cancer Hospital, Brompton, and the Royal Hospital for Incurables; and £500 each to St. Thomas's Hospital and Tottenham Cottage Hospital.—The late Mr. Thomas H. Lowthian, of Buxton, left £1000 each to the Devonshire Hospital, Buxton, the Manchester Royal Infirmary, and the Lancashire, Cheshire, and North Wales Council of the British Empire Cancer Campaign; and £500 to the Buxton Cottage Hospital.—By the will of the late Miss Agnes Jane Templeton, of Holme Hill, Dunblane, Perthshire, the following bequests have been made among others: £500 each to the Glasgow Royal Infirmary, Western Infirmary, Glasgow, Victoria Infirmary, Glasgow, and Glasgow Royal Cancer Hospital; £300 to Glasgow Medical Missionary Society.—The late Mr. Godfrey George Halsted, of Poling, in addition to other bequests, left £4000 to Chichester Infirmary.

PANEL AND CONTRACT PRACTICE

Another State of Mind.

WE recently commented on the state of mind of the insured persons in demanding what they consider to be their rights. It is relevant also to consider the state of mind of the insurance practitioner who has the responsibility of refusing or granting these demands. Practitioners quite justly resent any official action which seems to question their bona fides, and we receive letters objecting to the activities of approved society officials and of the staff of the Ministry of Health. And yet it is the plain duty of the Ministry to see that Act and regulations are properly administered; and in face of the Government Actuary's report and the results of recent investigations by the department, it is not to be wondered at that all means available should be used to ensure control. The big rise in sickness claims is seriously jeopardising the growth of additional benefits and stifling the development of the insurance scheme. That the position was and is still serious is shown by the introduction last week of a Government Bill to amend the rates of sickness and disablement benefit. One proposal is to reduce the sickness benefit of married women from 12*s.* to 10*s.* a week, and the disablement benefit from 7*s.* 6*d.* to 5*s.* The Government Actuary's report on the Bill states that even the reduced benefit rates for women will require an increase in contributions from 8½*d.* to 9*d.* to support them, if claims conform to the average of 1928–30. If the claims can be reduced by 10 per cent. the present contributions will be sufficient. In such circumstances it is essential that the state of mind of the insurance doctor should be the right one if he is to do his duty and further the interests of all his insured patients. Many recent attempts have been made to establish a better understanding between doctors and approved societies, and conferences for this purpose are being held up and down the country. A leading article in the *National Insurance Gazette* for April 30th remarks:—

> "The natural attitude of a doctor to his patient must be one founded on sympathy. We cannot possibly ask or expect the doctor to adopt the attitude of a suspicious detective. . . . But the root question, to us, is this: Do the doctors as a whole yet appreciate, as fully as is desirable, that they are being deceived by a number of their patients? Do they fully understand the proved facts and the unchallengeable statistics? The trade dispute claims, the holiday claims, the married women claims are plain enough. Insured persons are getting certificates of incapacity when they are not incapable of work. . . . We want the doctors, as a body, to be convinced that the proved facts call for their coöperation."

That is the considered view of approved society officials. "Very rarely indeed" the *Gazette* concedes, "is dishonesty the difficulty; the trouble is mistakes, in facts and points of view." This seems reasonable enough. If the insurance scheme is not to suffer lamentably at the hands of some certifiers some change in the point of view may be needed.

Drugs and Their Cost.

Under Article 6 of the consolidated regulations the Minister of Health determines the tariff of drugs supplied by chemists as part of medical benefit under the National Health Insurance scheme. The issue of a new tariff for the period April to September, 1932, gives occasion for comment on some features which may escape attention from their very familiarity.

Part I. deals with the calculation of charges for drugs, preparations, and appliances supplied to insured persons. The main principle of this method is that ingredients are charged at cost price and a dispensary fee is added for each prescription. Practitioners might do well to consider this more carefully than they have done in the past. For example, to order boric lint, oiled cambric, absorbent wool and bandage to a septic focus means a dispensing fee for each article supplied, whilst if the complete dressing is ordered under the title Standard Dressing No. 2 the same materials are supplied with only a single dispensing fee.

Part II. sets out details of dispensing fees, this year subject to a 10 per cent. deduction. It is cheaper when ordering capsules, lozenges, pastilles, tablets, or pills, if two dozen are required to order them at once rather than one dozen to be repeated in say a week's time. Provision is made that, in addition to the fee specified in the scale, actual out-of-pocket expenses are payable in respect of insulin, serums, vaccines, proprietary preparations, and appliances not included in the tariff which need to be obtained specially by the chemist.

Part III. gives the prices of drugs and preparations. Drugs, like other commodities, vary in price. Bismuth, for example, has been lately very expensive, but recently has dropped a little in price. The same applies to the iodides. Many of the chemicals used in dispensing come from abroad and will be subject to the 10 per cent. duty. This may have a substantial effect on the cost of prescriptions generally. It should be noted, however, that last year there was money over, after all the chemists' accounts had been settled, to pay a bonus of just over 15 per cent.

Part IV. contains the official list of appliances. Eye droppers are allowed, but not ear droppers. Eyeshades are not allowed. Hypodermic syringes for diabetic cases, not for asthma. There is doubt as to whether ribbon gauze is allowed. Adrenalin gauze is not in the list, although adrenalin and gauze may be ordered separately. The standard dressings have recently been made up in a more convenient size. No. 1 contains 36 × 12 in. of double cyanide gauze, grs. 180 of absorbent wool, and 1 in. × 3 yds. open wool bandage. No. 2 contains, 1 sq. ft. of boric lint, grs. 240 of cotton-wool, 6 × 6 in. of oiled cambric, and 2 in. × 4 yds. bandage.

Part V. notes the deposits to be made for containers supplied to insured persons, to be paid back when the container is returned in a clean condition. For ordinary medicine bottles over 4 oz. and under 10 oz. the deposit is 2*d.* Some time ago it was proposed that insured persons should be required to bring containers that are graduated, in order to avoid the waste of medicine if (say) 8 oz. of a mixture is placed by the chemist in a beer bottle brought by the insured person; but no regulation has yet been made on the subject.

The drug figures presented to the London Insurance Committees in March were as follows:

	1931.	*1930.*
Total prescriptions for the last quarter	2,145,578	2,144,008
Cost of ingredients	£29,539 0*s.* 11*d.*	£29,507 17*s.* 7*d.*
Cost of dispensing fees	£39,161 9*s.* 10*d.*	£38,984 15*s.* 0*d.*
Total cost of prescriptions	£68,700 10*s.* 9*d.*	£68,492 12*s.* 7*d.*
Average cost of ingredients	3·30*d.*	3·31*d.*
Average dispensing fee	4·38*d.*	4·36*d.*
Average total cost of prescriptions	7·68*d.*	7·67*d.*
Mean number of persons on lists	1,908,102	1,891,088
Average prescriptions per person	1·12	1·13
Average total cost per person	8·64*d.*	8·69*d.*

While the gross figures may appear large the unit figures are small. During the year 1931 chemists on the list dispensed 20,821 prescriptions for insulin at a total cost of £6756 4*s.* 11*d.*

CORRESPONDENCE

STERILITY.

To the Editor of THE LANCET.

SIR,—Mr. Victor Bonney's admirable address on Sterility presents the local aspects of the subject which he considers in a very lucid manner. As he says, the more general, namely, the effects of the internal secretions—and, he might have added, of the vitamins, particularly vitamins D and E—are more difficult to assess, but are undoubtedly of great importance. There are, however, one or two points in connexion with the remarks of Mr. Bonney which I should like to supplement.

Mr. Bonney refers to the beneficent effect that has been observed after dilatation of the cervices of relatively sterile nulliparæ, and says that as the cervical canal can never of itself be an obstruction to the ascent of spermatazoa "it is difficult to see how it [dilatation] acts." I think the explanation is this. Such cervices are unlacerated and embrace the dilators tightly; consequently a non-perforated dilator acts as a piston and forces air through the Fallopian tubes. Personally, I have used canalised dilators in order that fragments of endometrium or neoplasms may not be driven through the tubes and become implanted on the peritoneum. This view is supported by the fact that simple transcervical insufflation of the tubes as now practised is not infrequently—more commonly, I think, than Mr. Bonney implies—followed by pregnancy. I entirely agree with what Mr. Bonney says about curettage. For sterility alone it is a vicious practice. Many men seem to have a "D. and C." complex; they cannot dilate the cervix without curetting also. I have seen several cases in which this operation has been followed by infection with blockage of the tubes.

The rest of my observations concern points of technique in regard to remedial measures. First, may I say how pleased I am to find Mr. Bonney a supporter of conservative methods in regard to the Fallopian tubes; and once more I may be allowed to remark that successful conservative surgery is largely dependent on operative skill, and opinions as to its merits are liable to be based on the technical competence of the surgeon concerned. As I was the first to advocate, describe, and illustrate insufflation of the Fallopian tubes from above (Article Disorders of Function in Eden and Lockyer's "System of Gynæcology," 1917) some years before Rubin introduced transcervical insufflation, I may claim to have had a very large experience of it and of reparative tubal operations. I do not believe the type of syringe used matters much, but I do think enough consideration has not been given to the type of point employed. This should be set at an angle to the body of the syringe, for one cannot always in a fat woman "deliver" the tube. The point itself should not be too long; it should be smooth, blunt, and tapering, as is one of those supplied with Gray's syringe for local anæsthesia. An olive-like swelling not far from the point may be an advantage by making for ease in compressing the tubal wall round the point with the thumb and first finger.

I fail entirely to see the advantage of using the sphygmomanometer attached to a metal tube passed through the cervix with the related clamping of the other tube, as advised by Mr. Bonney. As he mentions, it is practically always possible on insufflation to observe the site of obstruction, if any, by the dilatation of the tube behind the point of blockage. When the air passes readily into the uterus it can be heard—even by spectators present—roaring through the cervix; and, as I have often demonstrated, in the absence of any noise, air that has passed into the uterus can be felt gurgling in this organ when it is nipped between the finger and thumb, and expelled.

With regard to salpingostomy, I believe in imitating Nature so far as is possible, and therefore I do not perform a "cuff operation," but slit the tube for half an inch along the antimesenteric border, overturn the edges and bring the mucosal point down to the ovary in order that there may be a gutter-like entrance to the tube in imitation of the ovarian fimbria which I believe to be of importance, although it represents all that is "left" of the so-called hydrocele-envelope enclosing the orifice of the tube and the ovary in the hedgehog and in certain rodents.

Lastly, I do not like Mr. Bonney's method of tubal implantation. Has he found the tubes patent on subsequent transcervical injection with lipiodol? Implantation of the Fallopian tubes is admittedly a very delicate and difficult operation. I think it is absolutely essential that the tube be split at the uterine end, as in the case of the ureter to be implanted in the bladder, and that one flap be fixed to the anterior surface of the endometrium and the other to the posterior surface. Prior to the fixation a Cleveland ligature-forceps should be gently passed through the separated, but already dilated tube and a couple of strands of thin silkworm gut drawn through and allowed to project to the extent of about an inch beyond the abdominal ostium. The other ends should be coiled up and left in the uterine cavity to be withdrawn, with the patient under gas, a week or ten days later. This is easily accomplished if the cervix be slightly dilated and an angled pair of compression forceps be used to seize the threads. Again, it is necessary to ensure by incisions in the uterine wall that the tubes be not compressed as they pass through the uterus.

In spite of these suggestions I do not for one moment wish to imply that finality of technique in these intricate conservative operations has been reached. For this reason I have not written much about details, holding that, provided surgeons recognise the essential principles, the development of the best methods to secure the end desired is not long delayed.

I am, Sir, yours faithfully,

Liverpool, May 8th, 1932. W. BLAIR BELL.

SYNERGIC ACTION OF ŒSTRIN.

To the Editor of THE LANCET.

SIR,—In THE LANCET in 1928 (ii., 1020) we published a short paper showing that a preparation containing œstrin, when added to a bath containing an isolated uterus taken from a guinea-pig, had the effect of causing the muscle to contract more vigorously when pituitary (posterior lobe) extract was added to the bath; we observed that the preparation of œstrin used did not similarly affect the contractile response to histamine. We stated our opinion that the augmentation of the response to pituitary extract must be due to the œstrin itself, because a non-specific factor, such as protein, would have augmented the response to histamine as well. It

has since been stated by Heller and Holtz,[1] and also by Jeffcoate,[2] that solutions of crystalline œstrin exert no synergic effect of the kind described. We have also examined the effect of crystalline œstrin (which was not available in 1928), and we wish to state that we confirm Heller and Holtz, and Jeffcoate.

We are, Sir, yours faithfully,

ALECK BOURNE,
J. H. BURN.

London, May 5th, 1932.

UNDULANT FEVER.

To the Editor of THE LANCET.

SIR,—Dr. C. P. Beattie points out in your last issue (p. 1002) that in Scotland the routine examinations of Widal sera reveal a certain number of unsuspected cases of undulant fever. Our experience in this part of Wales is the same. Since 1928 we have added *Br. abortus* to the list of organisms to which we test the agglutinating power of Widal bloods and have found 4 out of 143 gave a titre of 1 in 250 or more. All four bloods proved to be from typical cases of undulant fever. On the other hand, all the others were negative in 1 in 25. We also tested the agglutinating power of 1325 Wassermann sera, and of these 6 gave partial agglutination in 1 in 40 and one agglutinated up to 1 in 50. It is clear therefore that the generally accepted titre of 1 in 100 can be taken as diagnostic. Again our findings regarding average cow's milk are the same as those of Dr. Beattie and others; 76 routine samples of mixed milks were specially examined for *Br. abortus* by my colleague Mr. J. H. Sugden, and of these 28—i.e., 37 per cent.—were shown to be positive by guinea-pig inoculation.

It is significant of the little interest taken in this subject that it is unusual for me to be asked to examine Widal bloods for undulant fever, although the clinical note sent with the specimens seldom points definitely to enteric fever.

I am, Sir, yours faithfully,

WM. PARRY MORGAN.

Institute of Preventive Medicine, Cardiff, May 7th, 1932.

CŒLIAC DISEASE AND DWARFISM.

To the Editor of THE LANCET.

SIR,—Statements by Dr. J. W. Shackle in a letter which you published on May 7th seem to us still further to support our view that the case in dispute was one of idiopathic steatorrhœa with associated bone deformities and a megalocytic anæmia. He now states that he does not regard the case as one of renal dwarfism. In the original description no mention is made of the character of the stools nor of a chemical estimation for the percentage of fats and fatty acids. It is a common experience that patients suffering from idiopathic steatorrhœa may present at times no diarrhœa. Dr. Shackle states that the symptoms "would have needed to be fairly severe to produce the degree of dwarfism that existed." On the contrary in adolescent patients severe cœliac rickets with dwarfism is commonly unassociated with diarrhœa, though indeed the stools are pale and porridgy and contain a large excess of split fats. In such cases the past history of diarrhœa may be obtained only on interviewing the parents, the patient having forgotten its occurrence. The explanation for this lies in the development of dilatation of the colon which may assume considerable proportions.

Concerning the blood picture, cases of Addisonian pernicious anæmia in children have indeed been described, but, so far as we are aware, no associated dwarfism has been recorded though a somewhat similar blood picture may occur with idiopathic steatorrhœa and dwarfism.

A case recorded in 1920 by Dr. H. L. Tidy is quoted by Drs. Hampson and Shackle in their original paper. The blood picture described in this case is quite unlike that found in Addisonian pernicious anæmia, since large numbers of immature white cells were found in the peripheral blood. The picture is, however, similar to that found in erythroblastic anæmia, of which we have studied two cases associated with the other symptoms of idiopathic steatorrhœa. These cases are shortly to be published. Erythroblastic anæmia is characterised by megalocytosis and high variability of the red cells, large numbers of nucleated red cells, and sometimes primitive white cells in the peripheral blood. Its association with bone lesions was first described by Cooley in 1927.[1]

Dr. Tidy himself suggests that the bone lesions in his case were secondary to the disturbances of hæmatopoiesis. In view of modern knowledge it is more likely that the two conditions are dependent upon failure to absorb essential factors, as are the other symptoms of the disease.

We are, Sir, yours faithfully,

JANET M. VAUGHAN,
DONALD HUNTER.

London Hospital, Whitechapel, E., May 9th, 1932.

DEEP X RAYS IN THE TREATMENT OF OSTEO-ARTHRITIS.

To the Editor of THE LANCET.

SIR,—In your leading article (April 30th, p. 941) on the economic aspect of the rheumatic diseases no specific mention was made of deep X rays. This treatment, it is true, has little value in the polyarticular variety of rheumatism, in the ulnar defection of the fingers and constitutional disturbance, generally known in this country as rheumatoid arthritis, but in the case of osteo-arthritis of hyperthymic type which occurs in middle-aged people who otherwise appear to be in good health, the effect of properly applied X ray treatment is often remarkable. Function as well as pain is beneficially affected, and the economic aspect therefore becomes of importance. Moreover, the treatment of osteo-arthritis by X rays can be carried out very largely by making use of existing hospital facilities. I have had personal experience of this work for three years, both in hospital and private practice, but most of my cases have so far been of the hospital type, and, unfortunately, all suffering from an advanced form of the disease with osteophytes and destruction of the intra-articular cartilages.

What can be done for these cases? In ascending order: (1) By the relief of pain the patients become less troublesome in their homes, and their relatives have more time and freer minds to deal with their own work. (2) Function may improve sufficiently for an almost helpless patient to get about the house and attend to himself. (3) A patient who has been able to walk a few hundred yards only may be enabled to return to light employment. (4) In a

[1] Jour. Physiol., 1932, xliv., 134.
[2] Jour. Obst. Gyn. Brit. Emp., 1932, xxxix., 67.

[1] Cooley, T. B., Witwer, E. R., and Lee, P.: Amer. Jour. Dis. Child., 1927, xxxiv., 923.

small but by no means negligible proportion of cases the patient's earning capacity may be fully restored.

Why should we allow patients to reach a state of crippledom? Early diagnosis, followed by radiotherapy and other suitable measures, would surely for the most part arrest organic change and prevent loss of function.

I am, Sir, yours faithfully,

F. HERNAMAN-JOHNSON.

Brook-street, W., May 9th, 1932.

THE EXPERT WITNESS.

To the Editor of THE LANCET.

SIR,—Facetious observations dovetailed into a serious discussion are proverbially dangerous. My remark concerning what expert witnesses think of each other, is a case in point (see THE LANCET of last week, p. 990). As the cold print of your excellent report may lead the reader to think I was serious, I venture to claim your hospitality to explain that the remark was intended to be jocular. Luckily the audience, which comprised several distinguished experts, understood—perhaps because I added the well-worn story about the Judges' address to Queen Victoria ("Conscious as we are of our imperfections, &c."). It is common knowledge that, however much experts may disagree in the witness-box, they usually have a generous appreciation of each other's qualities.

I am, Sir, yours faithfully,

20, Queen Anne's-gate, S.W., May 9th, 1932. RIDDELL.

R.C.S. COUNCIL ELECTION.

To the Editor of THE LANCET.

SIR,—Fellows of the Royal College of Surgeons have recently received two documents concerning the impending election to Membership of the Council.

The first of these documents was an appeal signed by members of the Court of Examiners and printed on paper bearing the address of the Examination Hall. It requested Fellows of the College to record their votes in favour of a Member of the Court. This document conveyed to many Fellows the impression of being of an official character, authorised or allowed by the ruling body of the College. It betrayed junior Fellows of the College, who had little experience of exercising their vote, into acting as the document requested. But the second missive showed how mistaken was the view that the first was official. For this document conveyed the terms of a resolution passed by the Council reproving the Court for its improper action which was strongly deprecated.

The difficulty which now confronts many of us in reference to what we regarded as an official request (now known to be a most reprehensible action) is that we have recorded our votes in a manner which, but for the pseudo-official action, we should never have contemplated. The counting of the vote may therefore record a result which we do not desire.

In view of this difficult position may I, on behalf of many friends as well as myself respectfully suggest to the Council that this election be regarded as invalid: or, if that is not possible, that the candidate concerned should consider his action? He would probably not desire to be elected by votes he has not himself earned; by votes, that is, mistakenly given in the belief that we were supporting the desires of a President and Council whom all of us regard with utmost respect, and whose wishes we should desire to observe.

I am, Sir, yours faithfully,

May 6th, 1932. F.R.C.S.

TRAINING IN TUBERCULOSIS.

To the Editor of THE LANCET.

SIR,—In your issue of April 30th (p. 954) Dr. Maurice Davidson makes the statement that there are "only four centres—viz., Manchester, Sheffield, Edinburgh, and Glasgow—at which the existing course of teaching in this subject forms a compulsory part of the curriculum for undergraduates. Instruction in other schools may be admirable, but attendance on the courses is voluntary." He adds: "In centres where no such facilities are offered in the teaching hospital itself, but where ample clinical material and organisation exists in the municipality, there is a lack of adequate coöperation between the medical school and the municipal authorities." So far as the University of Aberdeen is concerned these statements are contrary to the facts. Training in tuberculosis is a compulsory part of the curriculum of candidates for the degress of M.B., Ch.B. of Aberdeen, and has been so for a number of years. In Aberdeen, the university, the voluntary hospitals, and the town council coöperate in the closest and most friendly manner. The lecturer in tuberculosis in the university is also tuberculosis officer for the town council. The head of the public health department in the university is medical officer of the town council as were his two predecessors.

I am, Sir, yours faithfully,

H. J. BUTCHART,

May 6th, 1932. Secretary, Marischal College, Aberdeen.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED APRIL 30TH, 1932.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 62 (last week 96); scarlet fever, 1669; diphtheria, 813; enteric fever, 22; acute pneumonia (primary or influenzal), 947; puerperal fever, 38; puerperal pyrexia, 106; cerebro-spinal fever, 56; acute poliomyelitis, 3; acute polio-encephalitis, 4; encephalitis lethargica, 12; dysentery, 15; ophthalmia neonatorum, 115. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on May 3rd–4th was as follows: Small-pox, 106 under treatment, 2 under observation (last week 128 and 3 respectively); scarlet fever, 1479; diphtheria, 1308; enteric fever, 8; measles, 2632; whooping-cough, 423; puerperal fever, 14 (plus 6 babies); encephalitis lethargica, 224; poliomyelitis, 4; "other diseases," 99. At St. Margaret's Hospital there were 17 babies (plus 8 mothers) with ophthalmia neonatorum.

Deaths.—In 117 great towns, including London, there was no death from small-pox, 1 (1) from enteric fever, 94 (46) from measles, 4 (1) from scarlet fever, 54 (12) from whooping-cough, 25 (2) from diphtheria, 47 (12) from diarrhœa and enteritis under two years, and 72 (4) from influenza. The figures in parentheses are those for London itself.

Liverpool reported 19 deaths from measles, Manchester 3, Bradford and Leeds each 2. Liverpool also reported 6 deaths from whooping-cough, Bristol and Walsall each 3. Diphtheria was credited with 4 deaths at Manchester, 3 at Hull, 2 at Leeds.

The number of stillbirths notified during the week was 300 (corresponding to a rate of 42 per 1000 births), including 49 in London.

MANCHESTER STUDENTS' COLLECTION.—The amount collected by students of the University of Manchester at their Shrovetide rag this year was £4250, or over £1750 less than last year. The sum of £1000 has been allocated to the Royal Infirmary, and the remainder to other medical charities in Manchester and Salford.

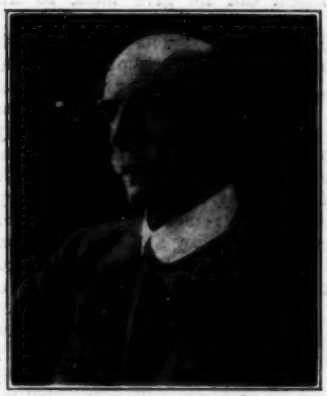
OBITUARY

SIR THOMAS MORISON LEGGE, C.B.E., M.D. Oxf., D.P.H.,

LATE SENIOR MEDICAL INSPECTOR OF FACTORIES.

WE regret to announce the death of Sir Thomas Legge, which occurred on Saturday, May 7th, at Wintergreen, Warlingham, in the 70th year of his age.

Thomas Morison Legge was born at Hong-Kong in 1863, the younger son of Prof. James Legge, the well-known Chinese scholar. He was educated first at Dollar Academy, of which he always preserved happy memories; but when his father was appointed Professor of Chinese at Oxford he was entered at Magdalen College School. He proceeded to Trinity College, Oxford, and completed his medical education at St. Bartholomew's Hospital. He graduated as M.B., B.Ch. Oxf. in 1890, and obtained the doctorate in 1894. He was brought up in an academic atmosphere which affected his whole life. He read physiology under Burdon Sanderson and Gotch at a time when J. S. Haldane and Leonard Hill were working in the laboratories, and obtained honours in the natural science school. Interested from the first in problems of public health he was fortunate in being able to make a long stay on the Continent investigating them. He paid a series of visits to Paris, Berlin, Brussels, Copenhagen, Stockholm, and Christiania (now Oslo), and in 1896 wrote a useful book, entitled "Public Health in European Capitals," describing the municipal sanitary administration in those cities. As a result mainly of the discriminating qualities of this work, he was appointed secretary of the Royal Commission on Tuberculosis which sat during 1896–98, and his familiarity with the foreign centres was most valuable to the Commissioners on their personal tours of inspection. On the conclusion of the labours associated with the Commission he worked for a short time under Sir Arthur Newsholme, then M.O.H. for Brighton, and was soon appointed the first Medical Inspector of Factories and Workshops, a post which he held for nearly 30 years. He was associated from the beginning with Sir Arthur Whitelegge, who had recently been brought from Yorkshire to be Chief Inspector of Factories, the appointment not being associated with his medical qualification. Legge threw himself with zest into the work. A description of that work was given modestly in the Shaw Lectures which he delivered before the Society of Arts in 1929, when he set out 30 years' experience of industrial maladies. In one of these lectures he described as the most exciting day of his life that on which he was able to connect posterior cortical cataract with the exposure to glare in a glass-blowing factory, confirming the observations of a half-blind trade-union official. An investigation into the existence of cataract among the members of certain large trade-union societies followed and confirmed Legge's findings. In the same Lectures he resumed his share in clearing up the causation of nystagmus and described inquiries into trinitrotoluene poisoning, grindstone silicosis, and many conditions, such as "beat-hand," "beat-elbow," and "beat-knee," which bulk largely in questions of compensation. The main message of these addresses was that the public were not cognizant of the conditions that existed, and in his Chadwick Lecture, delivered before the Institute of Hygiene, he developed the theme by insisting that his own profession, speaking generally, was little better informed. For he urged the necessity of teaching industrial hygiene to the medical student, regarding such subjects as vital statistics, factory hygiene, and industrial poisoning as barely dealt with in the medical curriculum, so that the duties of the practitioner in respect of preventive medicine and the sanitary administration of the country were left for the young doctor to find out for himself. He held that the medical student should receive a picture of the causes underlying industrial unrest, pointing out that the psychology of the worker and of the employer formed matters of first importance to the country. The theme was always a favourite one with him.



SIR THOMAS LEGGE.

Legge was recognised as one of the first authorities on anthrax in the country, and on this subject he delivered the Milroy Lectures before the Royal College of Physicians of London. Here he detailed the whole story of anthrax in relation to hides, skin, and horsehair, going elaborately into the arguments for and against certain lines of treatment of the human subject. The lectures were published in THE LANCET and the second of them contains a striking analysis of a series of cases of external anthrax treated by Sclavo's serum, when Legge came to the conclusion that with the use of the serum some sufferers were saved, and that internally it was the only treatment holding any hope of benefit. The subject of lead poisoning was also one which Legge made his own in respect of public health aspects. He instituted through his department wide and close inquiries into the amount of injury caused to the workers, and it became common knowledge to the public that for some years there had been a serious annual death-rate from plumbism. The Lead Paint (Protection Against Poisoning) Act followed, and in 1921, under the auspices of the International Labour Office of the League of Nations, with whose activities Legge was always in close relation, a draft Convention was agreed to by the representatives of 30 countries, including Great Britain, having for its object international measures against the disease. Under this Convention the use of lead paint for work was to be made prohibitive, but in 1927 in this country the restriction was not made absolute, only a regulation for the employment of the paint being required. Legge, who was a delegate of the British Government when the Convention had been agreed upon, resigned his position under the Home Office in protest; his convictions enjoined the course upon him, but fortunately his term of office had nearly expired.

In 1918 Legge had received the C.B.E. and in 1925 he was knighted. In addition to his valuable public deliveries, and his book already mentioned, Legge

translated and edited Rambousek's "Industrial Poisoning" and also wrote, in collaboration with Sir Kenneth Goadby, a work on Lead Poisoning and Lead Absorption. He lectured on industrial poisons in the London School of Hygiene and Tropical Medicine. He wrote in 1911 a short series of papers on medicine in Scandinavia for THE LANCET, which showed that the training and educational regulations in Sweden, Norway, and Denmark compared in many respects favourably with out own; he delivered the William Withering Memorial Lecture on Hygiene at Birmingham, and made many communications to scientific papers upon industrial disease, and public health; and received from the Royal College of Physicians of London the Bisset Hawkins Medal as an outstanding promoter of public health.

Prof. E. L. Collis writes: "Legge threw himself with enthusiasm into his duties, and rapidly became recognised as a leading authority on diseases of occupation. The work gave him scope to combine knowledge gathered from the past with facts observed in modern industries; for it was thus his training taught him to proceed. New data were reviewed in the light of past history; but the past was always suspect—something open to correction when it did not stand up to the acid test of newly acquired facts. As Milroy lecturer in 1906 he dealt with industrial anthrax; but his name must always be more closely associated with occupational lead poisoning. In this connexion he discovered that the main portal of entry of the poison into the body was by the lungs; he noted, in a masterly way, how the poisoning occurred in this industry and in that, not in accordance with the amount of manual contact with the metal, but in relation to the presence of dust arising from such lead compounds as were soluble in the body fluids. Upon this foundation has been built up the modern methods for preventing the generation of dust or for removing it by exhaust draughts, which have been so successful in controlling plumbism. To-day this old-time scourge has lost most of its terrors; in 1900 over 1000 cases were notified; to-day year after year fewer than 300 cases occur, notwithstanding trade expansion which has spread the risk and the influence of subsequent compensation Acts in bringing cases to light. Many to-day are the codes of regulations on the statute-book aimed at the control of this and other industrial diseases, for which he was responsible. Legge, if a disease could be prevented, held strongly and conscientiously that it must be prevented. Hence, finally, he retired earlier than he need have done from his post, because he disagreed with the provisions of the Lead Paint Act which permits the continued use of lead paints—a trade custom he held to be unnecessary and definitely dangerous. But he did not retire merely to rest on his well-earned laurels, for he had been knighted several years earlier; he turned now to extend a still helpful hand to the working man for whom he had already done so much, and became expert adviser to the Trades Union Council. During the quarter of a century he was a civil servant, Legge was member of a number of Government committees and placed his skilled knowledge before many more. Well known at home, his status was equally recognised abroad, not only in the United States and Canada where he made a lecturing tour, but also in Europe where he represented the Home Office at many international conferences.

"As a colleague, he was an ever helpful friend, always ready to consider a fresh viewpoint. His character was retiring, rather than forceful; but he never spared himself where he considered duty lay. The paths of honour and uprightness were simple for Legge to tread; he knew no others. As a young man he was a fine swimmer and skater, and was always physically active; but his life's hobby was the study of sixteenth century stained glass upon which he was an accepted authority. Here again he combined admiration for bygone art and workmanship with an appreciation of modern skill as portrayed in the windows after Burne Jones and others. This artistic side of the man came out also in his everyday work as he visited factories and saw human activity; for he maintained that grace and beauty were seen at their best as exemplified by man at work; the smith at his forge, road menders swinging sledge hammers, an anvil maker, or a coal heaver, called forth admiration while he would pause a moment to watch. He saw beauty in factory girls in their overalls, rather than among popular stage favourites. Much did he get from life, and much did he give back to his generation."

Dr. John C. Bridge writes: "The death of Sir Thomas Legge removes a pioneer of industrial medicine. To his colleagues he was never Sir Thomas, but 'Tommy.' A personality reserved to shyness and to those who did not know him perhaps apparently rude, but to us who worked with him and for him, a loyal and helpful colleague and chief. It was always interesting to go to him hoping to tell him something new and to hear him say, 'I remember in such and such a year' and then would follow a little lecture on the subject. One always felt that Legge had missed his vocation, he seemed so much better fitted for a more secluded life. An enthusiast is not always practical and Legge was an enthusiast. Sometimes one felt he did not appreciate the work one did; but though he had little use for words of thanks, he never failed to recognise and give full acknowledgement to the work of others. I remember so well saying to him one day after reading an article, 'But that is exactly what you told him (the writer), you ought to write and tell him so.' The reply was, 'So long as the facts are known, it does not really matter who makes them known. Does it?' That was the Legge we who worked with him knew—never jealous of those who learnt from his experience, and always ready to encourage the genuine worker. Industrial medicine was not his only subject of interest, and in art, music, and literature he might have become recognised as an expert, and he was an authority upon stained glass. Nothing pleased him better, after his day's work in some manufacturing town was done than to set out to paint a typical industrial scene. Industrial workers throughout the world owe much to Legge. The reduction of cases of lead poisoning in the pottery industry in this country alone is a memorial of which any man might be proud and this is due mainly to Legge's work. Generous to a degree in giving from his store of knowledge he had only these objects in view—to better conditions for the workers and to further the study of the subject to which he had devoted his life. One great regret is that he did not, when he retired from official life, set himself to write from his great experience all he knew of industrial disease. In choosing otherwise I know he felt he was learning his subject from another aspect."

Sir Thomas Legge married Norah, daughter of Mr. J. Mack, of West Grinstead, and is survived by his widow, two sons, and a daughter.

JOHN ABERNETHY WILLETT, M.D. Oxf., M.R.C.P. Lond.

WE regret to announce the death of Dr. J. A. Willett, which occurred on Thursday, May 5th, in a nursing home in London, in his sixtieth year.

John Abernethy Willett was the second of the five sons of Mr. Alfred Willett, the distinguished surgeon of St. Bartholomew's Hospital, his mother being the only daughter of Sir George Burrows, President of the Royal College of Physicians of London 1871/75. John Willett was educated at Westminster and at Oxford, and proceeded for his medical education to St. Bartholomew's Hospital. He obtained the double English qualifications in 1899, and in the next year graduated in medicine at Oxford, taking the M.R.C.P. Lond. three years later, and in 1906 passing to the M.D. degree. He held the usual resident appointments at St. Bartholomew's Hospital where, afterwards, he was chief assistant in the gynæcological and obstetrical department, and demonstrator of practical obstetrics in the school. Though failing to secure a place on the staff of his hospital he made a fine impression on his colleagues by the character of his work and the standard of his teaching. He was for a period resident medical officer at Queen Charlotte's Lying-in Hospital, and was shortly afterwards elected assistant physician to the City of London Lying-in Hospital and surgeon to the Samaritan Free Hospital. These latter appointments he was holding when he died, although he had just sent in his resignation to both of them, being in each case senior member of the staff. He was also gynæcologist to St. Andrew's Hospital, Dollis Hill.

The contribution to obstetrics by which Willett will best be known is his paper published in 1925 on the treatment of placenta prævia by continuous weight traction. This method was based on a very simple conception and, used in suitable cases, its great simplicity and ease of performance have real advantage over more complicated measures. The results of the use of Willett's forceps in this serious obstetrical condition have been good and have led to an increasing resort to this method of treatment. Both on the staff of the Samaritan Hospital and at the London Maternity Hospital he earned the particular gratitude of the nursing staffs for he was deeply interested in their share of the work and spared no trouble in making both the scientific and practical sides of nursing accessible to them.

Joe Willett, as he was generally known in his own small and intimate circle, was a very simple man, both in his professional and his ordinary life. He was not ambitious in the usual sense of the word and did not strive for public fame or consciously seek the approbation of his fellows. So simple was his life-plan that it seemed as if, early in his career, he had recognised his scope and had made up his mind not to go outside it. Within this scope, he was admirable in all he did and said, and was recognised as an absolutely trustworthy man whose views were sound. The possession of a private income sufficient for his needs enabled him to lead a quiet life (he even kept his name out of the Telephone Directory) and to avoid the fever and the fret of private practice. His pleasures and pursuits were just what would be expected: fishing, good music, and golf—but all enjoyed in a moderate and simple manner. Willett was a sound clinician and a born teacher, and these were the parts of his work which especially appealed to him. He gave of his best to the hospitals he served and the pupils he taught; medical students and post-graduates, midwives and nurses. There was nothing he enjoyed more than giving bedside instruction in the hospital or at the antenatal clinic. Though the reasons could be easily understood, it was a constant source of wonder and regret that with his instinct for clinical teaching he had never attained a position on the staff of a teaching hospital. In place of it, he threw himself wholeheartedly into the teaching of midwives and helped the Midwives Institute as a lecturer, on its advisory committee, and in organising courses of training and examination for the Midwife-Teachers' Certificate. When the Central Midwives Board took over this examination last year, his advice and his experience as an examiner were invoked by the board.

It may be asked whether one who wrote so little and spoke so seldom at medical societies exerted any influence on current obstetric thought? He did, in a quiet way, and almost entirely by personal contact with his colleagues and pupils. His outlook was not so much conservative as limited; and the limitation of his activities was imposed by a natural diffidence and an inborn dislike of competition with other men and other opinions. Willett will be missed by many friends who loved him for his simple character and his loyalty to high ideals of conduct.

ROYAL MEDICAL BENEVOLENT FUND.

AT a recent meeting the committee voted 55 grants, amounting to £997. The following are particulars of a few cases helped:—

Daughter, aged 85, of M.D. Father died in 1869 at the age of 79. The applicant, even at the age of 85, is still trying to maintain herself by her own efforts. She is assistant organist at the parish church, and also teaches music to children, and by these means earns £22 10*s*. She lives in her own small house; she takes in one lodger, who pays £27 a year. Up till recently she let three rooms in her house, but the tenant died last year, and the applicant has been unable to re-let. It was discovered that this old lady's total income was £76 16*s*., out of which she had to pay rates of £12 13*s*. Fund voted £26 in four instalments for a period of one year, to be renewed annually if circumstances remain the same.

M.R.C.S., aged 56. Had a stroke in the autumn of 1931, and is incapacitated for professional duties. His practice was small, and very little is expected from it. Private income of applicant and his wife, aged 59, does not exceed £50 a year. Fund voted £40, payable in four instalments over a period of one year.

Widow, aged 59, of M.R.C.S., was left penniless by the death of her husband in 1925. At first the applicant took a house and maintained herself by taking paying guests. Afterwards she took a post as housekeeper, which she retained for some years until her health broke down. She has now had to undergo a severe abdominal operation, and a medical report states that she will not be fit for remunerative work in the future.

The applicant therefore becomes entirely dependent on her two daughters, ages 30 and 22, each of whom has employment, but with small salaries. Fund voted £26, payable in four instalments over a period of one year.

Cheques should be made payable to the hon. treasurer of the Fund, 11, Chandos-street, Cavendish-square, London, W.1.

WEST END HOSPITAL FOR NERVOUS DISEASES.—Last year there were 522 new in-patients, a small reduction; there was also a fall in the number of out-patients, whose 41,256 attendances nevertheless showed an increase. The average weekly in-patient cost was £3 0*s*. 11*d*., a reduction of 6*s*. 6*d*. The facilities for adult patients to engage in handicraft under trained instruction have been so satisfactory that they have been extended to the children. The honorary surgeons now have the first call on the beds in two of the single-bed wards.

FEWER RHEUMATIC PATIENTS AT BATH.—The report for 1931 of Bath Mineral Water Hospital records a fall in the number of patients admitted from 1353 in the previous year to 1235; the stay rose from 39 to 41 days. The reduction is attributed in the main to "the determined effort that is being made to treat rheumatic disease not only at the recognised spas, but also at such an important centre as the Red Cross Clinic in London." The new diathermy apparatus at the hospital has had to be doubled, and a room has been arranged and apparatus provided for the examination of throats.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS.

HEALTH AND SAFETY IN MINES.

IN the House of Commons on May 3rd Mr. ISAAC FOOT, the Secretary for Mines, said the number of accidents in mines in 1931 gave some ground for encouragement as to the progress that was being made. The number of deaths in our coal-mines last year was the lowest in the history of the Department—namely, 859. That was 0·9 per 1000 of men employed, or 3·77 for every 1,000,000 tons raised. The serious accidents were 3304—the lowest on record. The smaller accidents—involving absence from work of more than three days—were about 140,000, or 26,000 less than in 1930 and 36,000 less than in 1929. Even allowing for the smaller number employed in the mines and although they were only taking the figures for one year, yet they regarded that as very gratifying. The real tragedy of the mines was the weekly return of accidents, not the big disasters. Everything that science could do must be done to make the big disasters impossible, but the real trouble of those concerned with health and safety was the daily cases. Taking the ten years from 1920 to 1929, for every casualty that arose from an explosion there were 1103 casualties arising from other causes. The most prolific cause of accidents was falls of ground. Next to that came haulage. One day they would have protective equipment in the mines. He had no doubt that in the future the use of helmets, gloves, safety boots, and goggles would be made compulsory. He was assured by those well qualified to speak upon it that a very substantial reduction in day to day accidents could be made by such simple precautions.

ACCIDENTS TO BOYS.

A most distressing feature of the returns was the number of accidents to boys. Last year 39 boys under 16 years of age were killed and 7000 boys under 16 were disabled by injury for more than three days. There was urgent need for more education. There had been printed pamphlets and circulars and the reports of the chief inspector and the eight divisional inspectors and the Department had carried through and completed the work started by his predecessor of holding safety conferences throughout the country. He would put on record his gratitude for the assistance given by the management and owners in helping to make those conferences a success. The expenditure of the Safety in Mines Research Board during the past year was about £50,000, which had been derived from the Miners' Welfare Fund. The importance of mine lighting was, first of all, because of the predominant medical opinion that the widespread disease of nystagmus was largely due to inadequate lighting and secondly because nothing contributed more to danger in the mines than the lack of proper lighting. Some months ago he had to consider whether a new regulation should not be issued establishing a new standard of lighting. He was anxious that they should not stereotype progress. He called together the representatives of the Mining Association and the Managers' Association and asked them to give him an assurance that during the next 12 months an improvement would be effected in this respect. That assurance was very readily given and the Department's inspectors were now at work throughout the country helping the recalcitrants and those who were behind their fellows in keeping up to the standard of these proposals. At the end of 12 months they would be able to consider whether the regulation ought to be imposed or whether their purpose had been achieved otherwise.

AN AMERICAN COMPARISON.

Sir FREDERICK MILLS said that two or three years ago he went to America and visited a typical mine in Pennsylvania run by a company which was in part a subsidiary of the United States Steel Corporation. It was one of the nearly 30 mines which were producing something like 30,000,000 tons of coal per annum. The system of working there provided ventilation on twice the scale of anything in this country. There was also better light. In that area the accidents were considerably less than in this country. He suggested that the Secretary for Mines should send a small deputation of two or three mining members and agents to see this process in operation. They could get the price of coal very materially reduced by adopting this system which would be attended with much less risk to the workpeople and give them better working conditions.

BETTER ILLUMINATION.

Mr. T. WILLIAMS said that within the past few years there had been a great demand for improved lighting in the mines. A lamp called the Wolf safety lamp had been the leading lamp and the guiding influence in the deliberations of the Mines Department. This lamp gave the highest illumination of any miner's lamp in existence at the moment. Fortunately or otherwise some parts of the lamp were imported from Germany where the lamp had been tried out for many years and had given entire satisfaction. It was in no way in competition with any other lamp. Therefore to do anything that would retard the import of this lamp would be to deny the miner increased candle power and to increase the number of accidents. As a result of the exchange situation between this country and Germany, British importers of this lamp were suffering a tremendous disadvantage, and on top of that they had to face an import duty of 10 or 20 per cent. which had well-nigh put this particular firm out of existence so far as supplying lamps to this country was concerned. He wished to know what the Mines Department had done to insist upon the Advisory Committee looking into this matter immediately and removing the duty. He had a report from an eminent expert on the question of nystagmus which gave proof beyond any shadow of doubt that as a result of the use of this type of lamp miner's nystagmus had been reduced in many mines and would be reduced in the future.

THE SECRETARY'S REPLY.

Mr. FOOT, replying to the debate, said that the question of the German safety lamp mentioned by Mr. Williams must go before the Import Duties Advisory Committee. He had no power to interfere, but the Department suggested that the importers might make representations to the Advisory Committee and if they communicated with the Department they would be happy to give them such information as was at their disposal.

NATIONAL HEALTH INSURANCE BILL.

On Thursday, May 5th, Sir E. HILTON YOUNG, Minister of Health, presented the National Health Insurance and Contributory Pensions Bill. This measure amends the enactments relating to National Health Iusurance, amends the Widows', Orphans', and Old Age Contributory Pensions Act, 1925, by making provision for the payment of pensions thereunder in respect of the insurance of persons who cease to be insured within 12 months before death or before attaining the age of 65, and modifies the statutory conditions applicable to such persons in the case of persons who, after ceasing to be insured, again become insured.

The Bill was read a first time.

ROAD ACCIDENTS.

In the House of Commons on May 6th Mr. PYBUS, Minister of Transport, said he must touch on one point which was ever present in his mind and in that of the Home Secretary—namely, the appalling

record of loss of life and often desperate injury on the highways of this country. The total figures of this ghastly record were not the end of the story. Those figures conveyed the fact that this tragedy spread far beyond its immediate surroundings to the relatives and dependants of the victims. Fortunately, public opinion, which was one of the strongest forces that could be brought to bear on this problem was now being awakened. Many advocated as the only solution of this tragic problem new legislation involving the imposition of still more severe penalties on the careless and dangerous driver. Whether such action might eventually prove to be necessary was not for him to say, but there was in their hands a most effective weapon and one which could be immediately applied—namely, the more proper observance of the law and the more rigorous enforcement of the penalties for which it provided.

THE HOSPITAL PROBLEM.

Mr. PARKINSON said that last year after the passing of the Road Traffic Act the number of accidents was considerably less, but there seemed to be a renewal of these accidents. The question of people who were injured and taken to hospitals was becoming a burning cry from every hospital in the country. It was a matter which the Minister should consider. The right hon. gentleman had great powers and he hoped he would exercise them in the interests of national safety and make the Road Traffic Act a really effective measure.

Mr. TINKER said he had had figures given to him in regard to the treatment of injured people in hospitals and the cost last year was put at more than £300,000. Hospitals complained that they were not getting anything like a fair return. He had had a letter from a hospital in his own constituency. The hospital was not a large one. Last year it cost that institution £694 to deal with accidents caused by motorists. He thought that the Road Traffic Act would go a long way towards providing a solution of this question, but this letter stated that the hospital had just received £100, or about one-seventh of the total cost of dealing with these accidents. He was wondering if the Minister of Transport was doing anything to strengthen the Act in this particular. The matter was important not only in his constituency but all over the country.

Mr. BEAUMONT said that the burden of road accidents on hospitals was a difficult problem and many of the suggested solutions were for various reasons impossible, but unless something was done to ensure that hospitals got some remuneration for the accident cases which they had to treat a great number of the smaller hospitals would have to close their doors. He asked the Minister to explore every avenue to see whether anything could be done to secure for the hospitals the assistance they so badly needed.

Mr. RHYS DAVIES said he was not so sure that cases were not being sent to hospitals to-day which were ordinarily treated by the medical practitioner before the National Health Insurance scheme came into operation. Since the medical profession had a reduction of 1*s.* per annum in their panel fees that might be an additional argument for the proposition he was suggesting. He would leave it there, except to say that it seemed rather curious with regard to accident cases sent to hospitals that the Automobile Association could not take this question up in respect of their members. If a member of the Automobile Association came into conflict with the law the Association paid the legal changes and if they could do that from their annual contributions they ought to contribute something towards the medical and hospital charges of their members as well.

THE ELEMENT OF NOISE.

Mr. LOVAT-FRASER said the motor-car had intro duced into our life an element that had greatly reduced comfort and pleasure—the element of noise. Was the Minister of Transport doing anything to mitigate that abomination? It was said that one got used to noise and that it did one no harm after a certain time. It did do one harm. (Cheers.) We all have a certain quantity of vital force and although we were not conscious of it that vital force was being used up in resisting noise. He asked the Minister to give them a word of assurance that something was being done to meet this growing evil.

HOUSE OF COMMONS.

THURSDAY, MAY 5TH.

Climatology and Health.

Mr. MCENTEE asked the Minister of Health whether, with a view to helping the Come-to-Britain movement, he would arrange for his medical officers to make a systematic study of climatology in relation to health, of the importance of providing facilities for cures, and of the way in which psychical influences may be developed.—Sir E. HILTON YOUNG replied: Attention is paid to the subject of climatology by the medical profession, and the subject is included in the course of study for diplomas in public health. The importance of facilities for treatment at health resorts is dealt with in a report on chronic arthritis issued by my department. I do not quite follow for what purpose the hon. Member recommends the development of psychical influences.

MONDAY, MAY 9TH.

Detention of a Feeble-minded Boy.

Dr. WILLIAMS asked the Minister of Health whether his attention had been called to the case of Harold Lee, who, owing to the effects of sleepy sickness, was paralysed and crippled, and who, instead of being sent to a suitable home, was detained at Rampton, an institution for mental defectives, where he suffered ill-treatment which necessitated the removal of his right eye; and whether he would cause an inquiry to be made into the conduct of this institution in order to ensure that, in future, only cases in which radical mental defect was present were kept there.—Mr. ERNEST BROWN replied: My right hon. friend's attention has been called to this case. Harold Lee is feeble-minded and partially paralysed. He was sent, in the first instance, to a residential special school for mental defectives, his mother having stated that he was dangerous and beyond her control. Owing to his violent behaviour he could not be retained at the special school, and was ultimately sent to the special block for children at Rampton. In May last year the patient, on his own admission, dislocated his own right eye, and this injury necessitated its removal. There is no foundation for the allegation that this was due to ill-treatment. The circumstances of the case have been very fully examined, and my right hon. friend does not consider that any further inquiry is called for.

Factory Accidents in India.

Mr. MORGAN JONES asked the Secretary for India if he could give information showing the total number of persons injured in accidents in those factories in India which were subject to the Indian Factories Act in 1931, or in the latest year for which figures were available; how many of these were cases of fatal, serious, and minor injury respectively; and what was the number of persons injured in this way per 100,000 of those employed in factories coming under the Act.—Sir S. HOARE replied: The figures for the year ending Dec. 31st, 1930, are as follows:—Number of fatal accidents, 240; serious, 4115; minor, 17,429; total, 21,784. Rate per 100,000: fatal, 15·7; serious, 269·2; minor, 1140·4; total, 1425.

Mr. MCENTEE asked the Secretary for India if he would give the latest available figures showing the number of factories in India coming under the Indian Factories Act, and the number of men and women factory inspectors employed under the Act.—Sir S. HOARE replied: The number of factories in India coming under the Indian Factories Act during the year 1930 (the latest year for which figures are available) was 8148. The number of factory inspectors employed under the Act during the year 1929 was 39, of whom one (in Bombay) was a woman.

TUESDAY, MAY 10TH.

Boy's Death on Spiked Railings.

Mr. MCGOVERN asked the Secretary for Scotland if his attention had been called to the fatal accident to the boy of 8 years of age at Parkhead, Glasgow, who fell on spiked railings; and if he would consider introducing legislation to give Scottish local authorities power to prevent the erection of such railings on buildings.—Sir ARCHIBALD

SINCLAIR replied: The answer to the first part of the question is in the affirmative. I am not satisfied, on the information before me, that legislation is required on this subject.

Mr. MCGOVERN asked if the right hon. gentleman was aware that since this question was put down another child had been impaled in Glasgow on spiked railings, and that numbers of workmen had slipped from roofs of buildings and had been killed in this way; and would the right hon. gentleman not consider doing something to save human life from this danger.

Sir A. SINCLAIR: I can only answer the question which has been put on the Order Paper. In that case the boy fell from a height of 30 feet, and if he had not fallen on the railings he would have fallen on the concrete pavement. If the local authority asks for powers their request will certainly be considered very carefully by the Government.

Accidents to Pedestrians.

Lieut.-Colonel MOORE asked the Secretary for Scotland whether his attention had been called to the report of the chief constable of Ayr, stating that nearly all accidents to pedestrians were caused by carelessness on the part of the injured persons; and whether he had received reports on this subject from other police authorities in Scotland.—Sir ARCHIBALD SINCLAIR replied: The answer to the first part of the question is in the affirmative. The statement of the chief constable was based on a detailed examination of the causes of accidents occurring in the county of Ayr during 1931. Some other chief constables have reported that in their districts a large percentage of accidents are due to carelessness on the part of pedestrians.

Lieut.-Colonel MOORE: Is the right hon. gentleman taking any steps in conjunction with the Minister of Transport to bring home to pedestrians their responsibility in this matter of street accidents?

Sir A. SINCLAIR: I will consider the suggestion of my hon. friend.

Experiments on Animals.

Mr. GROVES asked the Home Secretary the nature of the 12 experiments performed upon animals under Certificate A, without anæsthetics, during the year 1930 at the place No. 222 registered for vivisection; what premises constituted the aforesaid registered place; and what were the qualifications of the experimenters.—Sir HERBERT SAMUEL replied: The experiments referred to were the feeding of animals for the purpose of testing foodstuffs. The registered premises are the research laboratory of Messrs. J. and J. Colman's Carrow Works, Norwich; and the two experimenters were experienced research chemists.

Dental Treatment for the Police.

Mr. RICHARD RUSSELL asked the Home Secretary if he was aware that the provisions of his Order concerning dental treatment of the police were not being complied in the following areas: the county borough of Dewsbury, where a very low scale of fees formed the basis of the cost payable by the local police authority, the balance representing the difference, if any, between that scale and the fees of the private practitioner being payable by the officer; the city of Birmingham, where a scheme had been adopted in which no provision was made for the filling or scaling of teeth; and whether he was prepared to receive a deputation from the organisations representing the dental profession to discuss the difficulties which had arisen in connexion with the provision of dental treatment for the police.—Sir H. SAMUEL replied: I have made inquiry and cannot find that the arrangements made by the police authorities in question are in conflict with the police regulations. I will bear in mind the suggestion that I should receive a deputation, but I do not think that there is occasion for it at present.

MEDICAL NEWS

University of London.

Among appointments to the Senate for 1932–36, Lord Dawson has been reappointed by the Faculty of Medicine, and Dr. A. M. H. Gray by the General Medical Schools.

University of Edinburgh.

On May 5th the following diplomas were conferred:—

Diploma in Public Health.—*Euphemia T. Guild and *Janet C. Ronaldson.

Diploma in Psychiatry.—C. D. Bruce, *A. S. M'Culloch, and Flora M. Stewart.

Diploma in Tropical Medicine and Hygiene.—*J. E. Dovey, *J. M'K. A. Lowson, and Thomas Menzies.

*=In absentia.

Royal College of Physicians of Edinburgh.

At a quarterly meeting of the College on May 3rd, with Dr. Robert Thin, the President, in the chair, Dr. William Lindsay Lamb (Aberdeen) took his seat as a Fellow, and Dr. John McIntosh Morgan (Dundee) was elected to the Fellowship. Sir Norman Walker was elected a representative of the College on the committee of management of the Triple Qualification. Dr. A. Fergus Hewat was elected a trustee of the College. Dr. Edith Kate Dawson was awarded the Lister Fellowship for original research.

Marie Curie Hospital.

The annual meeting of this hospital was held on May 6th, Miss Chadburn, M.D., the chairman of the board of management, presiding. Sir Cuthbert Wallace spoke on radium therapy and on the good work being done at the hospital, and Mr. G. K. Chesterton then proposed the re-election of the board of management. The report showed that since the Marie Curie Hospital Clinic was begun in 1925, over 700 cases of uterine cancer have been treated with radium, and during 1931, 145 of these cases were treated; also 29 cases of cancer of the breast, 6 of cancer of the rectum, and 152 cases of non-malignant uterine hæmorrhage. Nearly 80 per cent. of the uterine cases applying at the clinic are advanced when first seen. Special appreciation was expressed by Dr. G. Hurdon, the director of research, of the work of the Follow-up Committee organised by Lady Fletcher; a very large proportion of the patients treated during the whole life of the hospital have been traced, and are periodically visited if they do not report progress. The charges for beds in the private wards are from 5 to 15 guineas per week, according to accommodation; and patients in the general wards contribute up to 3 guineas weekly according to their means.

Institute of Medical Psychology.

The annual meeting and luncheon of this Institute (formerly the Tavistock-square Clinic) will be held at the Hotel Great Central, Marylebone-road, London, N.W., from 12.15 to 2.45 P.M. on Tuesday, May 31st.

National Association for the Deaf.

The Lord Mayor of London, Sir Maurice Jenks, will preside at the eighth annual meeting of this association, which will be held at the Mansion House at 3 P.M. on Friday, May 27th. The speakers will include the Archbishop of Canterbury and Lord Charnwood.

London Hospital Medical College.

A course of six lectures on the Structure of Molecules in Relation to Biology and Medicine will be given by Dr. J. R. Marrack in the Bearsted clinical theatre of the London Hospital at 5.15 P.M. on Tuesdays and Thursdays from June 14th to 30th. The course is open to students of London University and to members of the medical profession.

Fellowship of Medicine and Post-Graduate Medical Association.

Four similar "refresher" courses in medicine, surgery, and the special departments will be given at the Prince of Wales's General Hospital, Tottenham, from May 23rd to June 4th, June 6th to 18th, June 20th to July 2nd, and July 4th to 16th. There will be lectures and demonstrations daily from 10.30 A.M. to 5.30 P.M., with instruction in the out-patient departments. Antenatal demonstrations will be given at the Royal Free Hospital by Dame Louise McIlroy at 5 P.M. on Wednesdays, June 1st to 22nd. An all-day course in gynæcology will be held at the Chelsea Hospital for Women from June 6th to 18th, and one in diseases of the chest at the City of London Hospital, Victoria Park, from June 6th to 18th; there will also be a week-end course on diseases of the chest at the Brompton Hospital, on June 25th–26th. A series of three epidiascope and laboratory demonstrations will be given by Dr. Knyvett Gordon at 10, Bedford-square, at 8.30 P.M., on Wednesdays, May 18th and 25th, and June 1st. The subjects will be Anæmia, Hæmorrhage, and Splenic Enlargement. Three lectures on Epidemic Encephalitis will be given by Prof. Arthur Hall, at 8.30 P.M., on Thursdays, June 2nd, 9th, and 16th. The first and last lectures will be delivered at 11, Chandos-street, W., and the second (with a cinema demonstration) at Bush House, Aldwych. All courses and lectures are open only to members of the Fellowship of Medicine, whose office is at 1, Wimpole-street, W.1.

Dr. E. Meinicke has been made an honorary professor in the University of Münster in recognition of his services to syphilology.

British Dental Hospital.

Sir Norman Bennett will preside at the annual meeting of this hospital to be held at the rooms of the British Dental Association, 23, Russell-square, W.C., at 8 P.M., on Thursday, May 19th.

Radium Institute, London.

Lord Dawson has been elected a member of the committee of this institute.

Research Defence Society.

Sir Arthur Keith, F.R.S., will deliver the Stephen Paget memorial lecture at the annual general meeting of this society, which is to be held at 3 P.M. on Wednesday, June 15th, in the lecture hall of the London School of Hygiene and Tropical Medicine, Keppel-street, W.C.

Malcolm Morris Lecture.

The fifth Malcolm Morris memorial lecture will be given under the auspices of the Chadwick Trust in the lecture hall of the Royal Society of Arts, John-street, Adelphi, London, at 5.15 P.M. on Monday, May 23rd. The lecturer will be Sir Ernest Graham-Little, and his subject Dermatology as an Outpost of Medicine.

Epsom College Royal Medical Foundation.

The Council of the College will shortly award a "France" pension of £30 a year to a duly qualified medical man of not less than 55 years of age. If the candidate is a single man or a widower, his income, independent of any allowance from the College or from the Royal Medical Benevolent Fund, must not exceed £100 per annum. If he be married, the combined income of himself and his wife must not exceed £150 per annum. Forms of application should be obtained forthwith from the Secretary, Epsom College, 49, Bedford-square, W.C.1, and must be returned, completed, to him not later than June 15th, 1932.

British Health Resorts Association.

At a conference held at Newquay last week-end it was resolved that a medical committee for the county of Cornwall should be formed to coöperate with the other committees in the south-western region of England and with the central organisation. Mr. J. C. Williams, Lord-Lieutenant of Cornwall, presided at the opening of the conference, and the speakers included Dr. F. G. Chandler, Dr. Fortescue Fox (chairman of the medical advisory committee of the Association), Dr. A. G. P. Hardwick (medical officer of health for Newquay), Sir Arthur Carkeek (chairman of the Cornwall County Council), Major Hilgrove McCormick (secretary of the Duchy of Cornwall), and Dr. W. Langdon Brown. Visits were paid to Falmouth, Penzance, Land's End, and St. Ives.

A regional conference of the Association will be held at Llandrindod Wells from May 20th to 23rd. The chairmen at the two sessions on Saturday, the 21st, will be Sir Humphry Rolleston and Sir William Willcox. On Sunday the conference will be entertained by the mayor and corporation of Aberystwyth.

Births, Marriages, and Deaths

BIRTHS.

ASTLEY COOPER.—On May 2nd, at White Cross Nursing Home Edgbaston, Birmingham, the wife of T. Astley Cooper M.B., Ch.B., of a son.

JOHNSON.—On May 2nd, the wife of Athol J. Johnson, M.B., B.Ch. (W.A.M.S. reserve), of a son.

PARRY.—On May 3rd, the wife of Wilson E. C. Parry, M.R.C.S., L.R.C.P., The Limes, Ampthill, Beds, of a son.

SHAW.—On May 7th, at Welbeck-street, the wife of Wilfred Shaw, M.D., F.R.C.S., of a son.

MARRIAGES.

MCKINSTRY—HOLMAN.—On May 7th, at All Souls' Church, Loudoun-road, N.W., William Kilbourn McKinstry, M.A. Camb., M.R.C.S. Eng., L.R.C.P. Lond., to Sibyl Mildred, second daughter of Dr. and Mrs. F. Kay Holman, of Avenue-road, Regent's Park, N.W.

ROCHE—BRIGGS.—On May 7th, at the Register Office, Kensington, Alex. E. Roche, M.D., M.Ch., F.R.C.S., to Cicely Mary, only daughter of Mr. and Mrs. Briggs, of 21, Wellington-road, Enfield.

DEATHS.

GRAY.—On May 6th, at Dalreoch, Bournemouth, Alexander Gray, M.A., LL.B., M.D.

LEGGE.—On May 7th, at Wintergreen, Warlingham, Sir Thomas Morison Legge, M.D., C.B.E., Medical Adviser to the Trades Union Council, late of the Home Office, aged 69.

MCCLELLAND.—On April 13th, at Llwynwern, Dowlais, Glam, Robert Sloan McClelland, M.D.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

TUESDAY, May 17th.—5 P.M., SPECIAL MEETING OF FELLOWS: Nomination of Officers and Council. 5.30 P.M., GENERAL MEETING OF FELLOWS: Ballot for election to the Fellowship.

THURSDAY.—5 P.M., DERMATOLOGY. (Cases at 4 P.M.) Annual General Meeting. Cases: Dr. H. W. Barber: 1. Unilateral Scleroderma Associated with Atrophy of the Subcutaneous and Muscular Tissues. 2. Sarcoid. Dr. H. D. Haldin-Davis: 3. Dermatitis Repens. Dr. Norman Burgess: 4. Pruritus Scroti Associated with Multiple Sebaceous Cysts. Dr. W. N. Goldsmith: 5. Epithelioma Adenoides Cysticum. 6. Cheilitis Exfoliativa. 7. Leiomyoma (photomicrographs). Other cases will be shown. 8 P.M., NEUROLOGY: Pathological Specimens. 8.45 P.M., Annual General Meeting.

FRIDAY.—5.30 P.M., PHYSICAL MEDICINE. Annual General Meeting. 8.15 P.M., OBSTETRICS AND GYNÆCOLOGY: Annual General Meeting. 8.30 P.M., RADIOLOGY. Annual General Meeting. Slides illustrating cases of radiological interest will be shown by Dr. H. Courtney Gage, Dr. R. Fawcitt, and Dr. G. B. Bush.

ROYAL MICROSCOPICAL SOCIETY, B.M.A. House, Tavistock-square, W.C.

WEDNESDAY, May 18th.—At 5 for 5.30 P.M., Prof. Hamilton Hartridge: 1. A Microscope Projector for Making Drawings. 2. A Microscope Projector for Lecture Purposes. Dr. P. R. Peacock, and Dr. L. Woodhouse Price: On the Cinematographic Examination of Serial Sections as an Aid to Histology.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE (Manson House, 26, Portland-place, W.),

THURSDAY, May 19th.—8.15 P.M., Dr. F. W. O'Connor (New York): A Paper on the Ætiology of the Disease Syndrome in *Wuchereria bancrofti* Infections. Demonstration at 7.45 P.M. arranged by Dr. O'Connor.

CHELSEA CLINICAL SOCIETY.

TUESDAY, May 17th.—8.30 P.M., preceded by a Dinner at 7.30 P.M. (at the Hotel Rembrandt, Thurloe-place, S.W.), Mr. Edward Mitchell will open a Discussion on Recent Developments in Domestic Architecture.

ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION.

THURSDAY, May 19th.—2.30 P.M. (at 11, Chandos-street, Cavendish-square, W.), Quarterly Meeting. Dr. Edwin Goodall: The Exciting Cause of Certain States of Disease at present classified under "Schizophrenia" by Psychiatrists may be Infection.

BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck-street, W.

THURSDAY, May 19th.—8 P.M., Annual General Meeting. Dr. J. C. Mottram: 1. On the Relationship of Beta and Gamma Radiation in the Treatment of Tumours; 2. The Action of Radium on Blood-supply—The White Reaction.

FRIDAY.—11 A.M., Visit to the X ray department of St. Bartholomew's Hospital. 5 P.M., Cases. 5.30 P.M., Dr. S. Cochrane Shanks: X Ray Treatment of Ringworm. Dr. P. H. Whitaker: Hepatography and Lienography by Thorium.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.1.

MONDAY, May 16th to SATURDAY, May 21st.—LONDON LIGHT AND ELECTRICAL CLINIC, Ranelagh-road, S.W. An evening course in Physical Medicine. Mons. and Weds. from 8 to 9 P.M. Demonstrations on cases.—MAUDSLEY HOSPITAL, Denmark-hill, S.E. Afternoon course in Psychological Medicine.—ST. JOHN'S HOSPITAL, Leicester-square, W.C. Afternoon course on Dermatology. Clinical work at 2 P.M. and 6 P.M. daily, and lectures on Mond., Tues., Thurs., and Fri. at 5 P.M.—CLINICAL PATHOLOGY, 10, Bedford-square, W.C. Epidiascope and Laboratory demonstration by Dr. Knyvett Gordon on Wed. at 8.30 P.M., on Anæmia. (The above courses are open only to Members of the Fellowship of Medicine.)

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith-road, W.6.

TUESDAY, May 17th.—10 A.M. to 1 P.M., Medical Wards, Surgical Demonstration, Throat Operations, Dental Department. 2 to 4 P.M., Operations, Medical, Surgical, and Throat Out-patients.

WEDNESDAY.—10 A.M. to 1 P.M., Medical Wards, Children's Medical Out-patients. 2 to 4 P.M., Gynæcological Operations, Medical, Surgical, and Eye Out-patients. 4.45 P.M., Venereal Diseases Demonstration.

THURSDAY.—10 A.M. to 1 P.M., Neurological Out-patients Fracture Demonstration. 2 to 4 P.M., Operations, Medical, Surgical, Genito-Urinary, and Eye Out-patients. 4.15 P.M. (Lecture), Mr. Simmonds: Surgery of Joint Injuries.

FRIDAY.—10 A.M. to 1 P.M., Medical Wards, Skin Out-patients, Dental Department. 12 noon, Medical Lecture. 2 to 4 P.M., Operations, Medical, Surgical,

and Throat Out-patients. 4.15 P.M. (Lecture), Mr. Batchelor: Diseases of the Rectum.
SATURDAY.—9 A.M. to 1 P.M., Throat Operations, Medical and Surgical Wards, Surgical and Children's Medical Out-patients. The lectures at 4.15 P.M. on Mondays, Tuesdays, Thursdays, and Fridays are open to all medical practitioners without fee.

NATIONAL HOSPITAL, Queen-square, London, W.C.
TUESDAY, May 17th.—2 P.M., Dr. Walshe: Out-patient Clinic. 3.30 P.M., Mr. Julian Taylor: Spinal Injuries.
WEDNESDAY.—2 P.M., Dr. Martin: Out-patient Clinic.
THURSDAY.—2 P.M., Dr. Kinnier Wilson: Out-patient Clinic. 3.30 P.M., Dr. Riddoch: Neurosyphilis.
FRIDAY.—2 P.M., Dr. Adie: Out-patient Clinic. Mr. Elmquist: Demonstration of Re-educative Exercises.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James's Hospital, Ouseley-road, Balham, S.W.
MONDAY, May 16th.—4 P.M., Mr. V. Z. Cope: Demonstration of Surgical Cases.

LONDON JEWISH HOSPITAL, Stepney Green, E.
THURSDAY, May 19th.—4.15 P.M., Mr. J. Lauer: Dental Treatment in General Medicine.

HOSPITAL FOR EPILEPSY AND PARALYSIS, Maida Vale, W.
THURSDAY, May 26th.—3 P.M., Dr. Douglas McAlpine will demonstrate.

UNIVERSITY COLLEGE, Gower-street, W.C.
THURSDAY, May 19th.—5.30 P.M., Dr. C. S. Myers: Absurdity of any Mind-Body Relation (Hobhouse Memorial lecture).

LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, 49, Leicester-square, W.C.
THURSDAY, May 19th.—5 P.M., Dr. I. Muende: Pathological Demonstration.
FRIDAY.—5 P.M., Dr. W. Griffith: Bullous Eruptions.

ST. PAUL'S HOSPITAL, Endell-street, W.C.
WEDNESDAY, May 18th.—Mr. S. Cade: Radium in Treatment of Cancer of Prostate.

ST. MARK'S HOSPITAL, City-road, E.C.
THURSDAY, May 19th.—4.30 P.M., Mr. W. B. Gabriel: Elucidation of Rectal Symptoms (Irritation).

ST. PETER'S HOSPITAL, Henrietta-street, Covent Garden, W.C.
WEDNESDAY, May 18th.—3 P.M., Dr. E. J. Roth: Radiological Investigation of the Kidney.

NATIONAL CENTRE AND POST-GRADUATE SCHOOL OF RADIOTHERAPY, Riding House-street, W.
WEDNESDAY, May 18th.—4.30 P.M., Mr. M. Donaldson: Radiotherapy and Gynæcology.

ROYAL INFIRMARY, Glasgow.
WEDNESDAY, May 18th.—4.15 P.M., Dr. A. M. Crawford: Medical Cases.

Appointments

ERSKINE, W. A., M.B., Ch.B. Edin., has been appointed Medical Officer to the Post Office at Bristol (District 6).
RUSHWORTH, J. A., M.R.C.S., L.R.C.P. Lond., Assistant Tuberculosis Officer in the Liverpool Health Department.
STEWART, D., Certifying Surgeon under the Factory and Workshop Acts for Newtyle District, Angus.

London County Council: MCMAHON, T. B., M.D. Dubl., Assistant Medical Officer (Grade II.), St. Pancras. WALLACE, W. H. S., M.B., B.S. Lond., D.P.H., Assistant Medical Officer (Grade II.), St. Luke's, Chelsea; HEATHCOTE, Columba, M.B., B.Ch., B.A.O. Dub., Assistant Medical Officer, (Grade II.), St. Benedict's; MASON, J. H., M.B., B.S. Lond., Assistant Medical Officer (Grade II.), Archway; Hunter, A. I., M.B., Ch.B. New Zealand, Assistant Medical Officer (Grade II.), St. Mary (Islington); Hill, R. A., M.B., B.S. Lond., Assistant Medical Officer (Grade II.), Highgate.

Vacancies

For further information refer to the advertisement columns.

Altrincham General Hospital.—Sen. and Jun. H.S. At rate of £150 and £120 respectively.
Banbury, Oxon, Horton General Hospital.—Res. M.O. At rate of £150.
Barrow-in-Furness, North Lonsdale Hospital.—H.S. £175.
Bedford County Hospital.—Second H.S. At rate of £140.
Birmingham and Midland Eye Hospital, Church-street.—Two Out-patient Officers. Each 1 guinea per session.
Birmingham, Queen's Hospital.—Surgeon for Out-patients. £50.
Brighton, Royal Sussex County Hospital.—Cas. H.S. £120.
Bristol, City and County of.—Asst. M.O.H. £500.
Bristol General Hospital.—Hon. Obstet. Phys. and Gynæcologist, Hon. Asst. Obstet. Phys. and Gynæcologist, also Hon. Surg. and Hon. Asst. Surg.
Bristol, Queen Victoria Jubilee Convalescent Home.—Surgeon. £120.
Buxton, Derbyshire, Devonshire Hospital.—Asst. H.P. At rate of £150.
Camberwell House, London, S.E.—Third Asst. M.O. £300.
Cardiff, City Lodge Institution.—Asst. M.O. £150.
Cardiff, Welsh National School of Medicine.—Chair of Obstetrics and Gynæcology. £300.
Carlisle, Cumberland Infirmary.—Second H.S. £155.
Chester, City and County.—M.O.H. and School M.O. £800.
Chester Royal Infirmary.—Hon. Ophth. Surgeon.
Chesterfield and North Derbyshire Royal Hospital.—H.S. £150.
City of London Maternity Hospital, City-road, E.C.—Asst. Res. M.O. At rate of £80 to £100.
Colchester, Essex County Hospital.—Asst. H.S. £120.
Coventry and Warwickshire Hospital.—Res. Cas. O. £125.
Cumberland, Blencathra Sanatorium, Threlkeld.—Asst. Med. Supt. £300.
Derby, Derbyshire Royal Infirmary.—Ophth. H.S. £150.
Doncaster Royal Infirmary.—Cas. H.S. At rate of £175.
Durham County Council.—Asst. Welfare M.O. £500.
Durham, Richard Murray Hospital, Blackhill.—Res. M.O. £450.
East Ham County Borough.—Asst. M.O. £500.
Edmonton, Edmonton and Brentwood Colony, Silver-street.—Consultant Neurologist. £125.
Elizabeth Garrett Anderson Hospital, Euston-road, N.W.—H.P., Obstetric Asst. Also three H.S.'s. Each at rate of £50.
Evelina Hospital for Sick Children, Southwark, S.E.—H.P. At rate of £120.
Glasgow Royal Mental Hospital.—Physician Supt.
Glasgow University.—Tennent Chair of Ophthalmology.
Glasgow, West of Scotland Neuro-Psychiatric Research Institute.—Director. £850.
Gloucester, Gloucestershire Royal Infirmary, &c.—Asst. Surgeon.
Hospital for Sick Children, Great Ormond-street, W.C.—Part-time Jun. Cas. O. At rate of £150. Also H.P. and H.S. Each at rate of £100.
Hounslow, Heston and Isleworth U.D.—Asst. M.O.H. and School M.O. £500.
Ilford, King George Hospital.—H.S. At rate of £100.
Ipswich, East Suffolk and Ipswich Hospital.—H.S. £120.
Kidderminster and District General Hospital.—H.S. £150.
Kingston-upon-Hull, Hull Municipal Maternity Home and Infants Hospital.—Jun. Res. M.O. At rate of £100.
Lincoln County Hospital.—Jun. H.S. At rate of £150.
Liphook, Hants, King George's Sanatorium for Sailors.—Asst. M.O. At rate of £200.
Liverpool, Smithdown-road, Hospital.—Res. Asst. M.O.'s. Each £200.
L.C.C. District 11, Area IX., Deptford.—Temp. District M.O. £210.
London Light and Electrical Clinic, Ranelagh-road, S.W.—Hon. Consultant Gynæcologist.
London University.—Graham Scholarship in Pathology.
Maidstone, Kent County Ophthalmic and Aural Hospital.—Ophth. H.S. At rate of £200.
Manchester.—Asst. M.O. for Crossley Sanatorium, Delamere Forest, Cheshire. £200.
Manchester, Ancoats Hospital.—H.P. At rate of £100.
Manchester Babies Hospital, Burnage-lane, Levenshulme.—Jun. Res. M.O. At rate of £50.
Metropolitan Hospital, Kingsland-road, E.—Cas. O. £100. Also Surgeon to Ear, Nose, and Throat Department.
Middlesex County Council.—Dist. M.O. for Harmondsworth &c.—£97–100. Also Public Vaccinator.
Newark General Hospital.—Res. H.S. £175.
Newcastle-upon-Tyne, Eye Hospital.—Res. H.S. £150.
Poplar Hospital for Accidents, East India Dock-road, E.—Second Res. O. £175.
Preston Royal Infirmary.—Cas. O. £150.
Queen Charlotte's Maternity Hospital, Marylebone-road, N.W.—Dist. Res. M.O. At rate of £80.
Queen Mary's Hospital for the East End, E.—Res. M.O. At rate of £200. Also Cas. O., H.P.'s and H.S.'s. At rate of £150. and £120 respectively.
Reading, Royal Berkshire Hospital.—H.S. £150.
Royal Free Hospital, Gray's Inn-road, W.C.—Cas. O. At rate of £150.
Samaritan Free Hospital for Women, Marylebone-road.—Hon. Surg. to Out-patients.
South London Hospital for Women, Clapham Common, S.W.—M.O. in charge of Venereal Diseases Clinic.
South Shields, Harton Hospital.—Two H.S.'s. £150.
Surrey C.C.—Asst. M.O. £600.
Truro Royal Cornwall Infirmary.—H.S. £170.
Ventnor, I. of W. Royal National Hospital for Consumption.—Sen. Asst. Res. M.O. £400.
Wakefield, West Riding of Yorkshire C.C.—Asst. Tuber. O. £500.
Warrington Infirmary and Dispensary.—Jun. H.S. £175.
West End Hospital for Nervous Diseases, Welbeck-street, W.—Hon. Anæsthetist.
Wrexham and East Denbighshire War Memorial Hospital.—Hon. Ophthalmic Surgeon.

The Home Secretary gives notice of a vacancy for a Medical Referee under the Workmen's Compensation Act for the Atherstone and the Lichfield, Stafford, Tamworth, and Uttoxeter County Court Districts. Applications for the post should reach the Private Secretary, Home Office, Whitehall, London, not later than May 28th.

POPLAR HOSPITAL FOR ACCIDENTS.—The trustees of the Bernhard Baron estate have given £10,000 to this hospital to be spread over a period of five years. It is to be allocated to the fund for rebuilding the out-patients' department. This work is likely to cost £30,000, and at least another £10,000 will still be needed to complete it.

NOTES, COMMENTS, AND ABSTRACTS

THE HEALTH OF HENRY VIII.

Mr. Frederick Chamberlin, who has already written about the Private Character of Queen Elizabeth, now publishes a similar volume about her father King Henry VIII.[1] He has collected his facts from many sources, chiefly the State papers in England, France, Spain, and Italy, and has produced a graphic picture of Henry as a man. The chief interest for medical readers is the attempt to answer the often repeated accusation that the King had acquired syphilis and that his comparative failure of issue with the consequent matrimonial troubles was due to this cause. The conclusion at which Mr. Chamberlin arrives after a consideration of the facts now attainable are that at the best a verdict of Acquittal and at the worst one of Not Proven must be given. Born in 1491, six years after the battle of Bosworth Field, Henry was the second son and third child of Henry Tudor and Elizabeth of York, his father being 34 and his mother 26. Like his contemporary Gargantua he came into the world with the physique of a giant, broad and lusty, a mighty trencherman, assertive, proud, bubbling over with high spirits, and yet as Erasmus says of him at the age of 8, with something of Royalty in his demeanour and having a certain dignity combined with a singular courtesy. A musician by heredity, he was a regular chorister at the Chapel Royal at 10, and before he was 12 had written many pieces of Church music. Throughout his life he was an accomplished player on every kind of musical instrument from the organ to the flute. From early youth until the age of 44 he was a keen and constant dancer. The Spanish Ambassador, writing of him at the age of 16, says, "there is no finer youth in the world. He is already taller than his father and his limbs are of gigantic size." He was 6 ft. 2 in. in height when he was 23, measuring 42 in. round the chest and 35 in. round the waist. During the whole of his active life he was a mighty hunter, shooting deer with the crossbow, and a champion jouster when jousting was the national sport of the nobility of England and France. He fought in plate armour both on foot and mounted, and by sheer physical force could overthrow his adversary similarly accoutred. He was nearly killed at the age of 34 whilst tilting with the Duke of Suffolk. Riding with his visor up in a new helmet of his own invention the Duke's lance was shivered against the King's forehead and from this time onwards he began to complain of headaches. Ten years later, on Jan. 24th, 1536, the King being mounted on a great horse at Greenwich to run at the lists, both man and horse fell so heavily that all thought he was dead. It was reported to the French King that he lay without speaking for two hours and had not improved in consequence of the fall.

The state of Henry's health was a matter of vital importance in international politics, and the accredited agents made careful reports to their respective governments whenever he was ill. There was, however, very little to say, for he was singularly healthy until he reached middle age. A few colds in the head, one with hoarseness; measles or small-pox in 1514; a slight fit of ague in 1539 and toothache from time to time is all that could be stated about him, except that a trouble in connexion with his leg is mentioned on March 24th, 1537, when he was 45 years of age. The physicians at some unknown date previously had ordered an issue to be made. The issue never healed and eventually became an ulcer, which was occasionally painful, and on two occasions, once in 1538 and again in 1541, gave rise to symptoms possibly associated with an embolus. It was probably of the nature of a varicose ulcer, says Sir D'Arcy Power, to whom the question was referred as a point of some historical significance. This appears a likely explanation, for Sir Geoffrey Pole reported in November, 1538, that the King "had a sore leg that no poor man would be glad of." Throughout the medical record there is no mention of a mercurial course, a method of treatment which was well understood and was always advised by the surgeons of the period if there was the least suspicion of syphilis. The course took many weeks from beginning to end and could not have remained unknown to the Court. It is certain therefore that the King's physicians did not consider the ulcers to be syphilitic.

The obstetric history also bears out the non-syphilitic character of the abortions which occurred in the consorts of the King. Dr. J. W. Williams, professor of obstetrics at the Johns Hopkins University, believes that "no one has yet adduced evidence that syphilis is an important factor in the production of abortion in the first few months of pregnancy, and there is nothing in the history of Mary or Elizabeth to indicate that they had congenital syphilis." Dr. Eardley Holland reports that "there is nothing in the reproductive history of Elizabeth Blount, of Anne Boleyn, or of Jane Seymour even to suggest syphilis, and we are therefore left with the consideration of Catherine and the repeated stillbirths. Those who have investigated the causation of stillbirths are generally agreed that only about one in three cases of repeated stillbirths are due to syphilis; and in the syphilitic cases there usually occur also the births of living children with signs of the diseases either at birth or later in life. So far as I can gather there is no evidence that Queen Mary suffered at any time from congenital syphilis, nor does there appear to be any evidence that the child born in January, 1511, who lived for 52 days only, ever showed any signs of the disease." Prof. F. Williams, of the University of Pennsylvania, expresses himself more cautiously when he says "the medical history of the lives of Mary, Elizabeth, Edward and Richmond do not throw any direct light upon the question of their father being syphilitic unless one judges congenital defects and constitutional inferiority to be evidence of an inherited syphilis." No one could accuse Elizabeth of being constitutionally inferior; Mary suffered for many years from an ovarian tumour; Edward VI., like his uncle, Prince Arthur and his brother the Duke of Richmond, died of tuberculosis. It can therefore be safely assumed in the light of Mr. Chamberlin's researches that Henry VIII. did not suffer from syphilis.

[1] The Private Character of Henry VIIIth. By Frederick Chamberlin, LL.D. London: John Lane, The Bodley Head, Ltd. 1932. Pp. 390. Illustrated. 18s.

CORRIGENDUM.—Dr. S. C. Dyke writes regretting that in his article on the treatment of diabetes with higher carbohydrate diets, appearing in THE LANCET of last week, he confused Dr. F. M. Allen, of New York, the founder of the modern treatment of diabetes, with Dr. F. N. Allan, of the metabolic department of the Mayo Clinic.

MENTAL DISEASES IN THE NEAR EAST.

THE pioneer work of Dr. John Warnock among mental sufferers in Egypt is paralleled by that of the less well-known Lebanon Hospital for Mental Diseases in Syria, Palestine, and the surrounding countries during the last 32 years.

The report of Prof. Watson Smith, who has been medical director for 23 years, was presented at the annual meeting of subscribers held in London on May 4th. From a small beginning, this voluntary hospital has become one of the most important branches of the public assistance and medico-legal services of Syria, and its benefits to the individual are indicated by the fact that 3714 patients have now been under treatment there. A new house, with 40 beds, has been added during the year, bringing up the number of houses to 11, and of beds to 240. The patients show great variety of race and religion, and range from the rich and influential to the destitute and nameless. During the year 154 were admitted (112 men and 42 women), making 373 under treatment (237 men, 136 women), of whom 18 died, and 36 were discharged recovered, 49 relieved, and 8 not insane. At the annual meeting Dr. Doris Odlum pointed out that the proportion of recoveries was good compared with English work, also that the average duration of residence was only about one month—a much shorter time than in English mental hospitals, even in those for early nervous breakdown. Its importance as a training centre for mental nurses, on whose skill the progress of these patients so much depended, and for medical students who would later go out as doctors all over the Near East, could not be over-estimated. Dr. Watson Smith's work as lecturer in psychiatry at the University of Beirut was a most important supplement to his clinical work and teaching in the village six miles away. The hospital had passed safely through the period of the Great War, and with the help of the charitable public would surmount the Great Depression.

Dr. E. W. G. Masterman, chairman of the London committee, who presided, presented the general report, and pointed to the steady progress made year by year, and the importance of its international character in composition and in support. Drs. Percy Smith and Fortescue Fox, members of the committee since its beginning, spoke in whole-hearted support. Mr. Hourani, a Syrian member of the committee, bore witness, from personal knowledge, of the horrors from which this one and only mental hospital had saved many of his compatriots. Pastor Christol, a French missionary, told from experience of what it meant to live in Central Africa, where there was no attempt to deal with the insane; capping Dr. Odlum's account of Morocco, where these unhappy people were chained by the neck in semi-darkness in stone chambers in the heart of a city, by describing the more primitive method of abandonment in the forests. He pleaded that, later on, the London committee, with the aid of its auxiliaries in other countries, should do something for Africa, and especially for its suffering insane negroes.

The hospital is at Asfuriyeh, near Beirut, and the address of the London office is 55, Wellington-road, N.W.8.

JOHN LOCKE'S BOOKS.

Messrs. J. and E. Bumpus are at present exhibiting a collection of books and manuscripts belonging to John Locke, the philosopher. Locke took the degree of Bachelor of Medicine at Oxford, and the exhibition includes the Faculty granted him by the University to practise medicine. His letters give ample evidence that he gave medical advice to his many friends throughout the rest of his life, and corresponded with Thomas Sydenham and others about difficult cases. His library includes a great number of interesting early printed medical books, as well as his manuscipt note-books of treatments and prescriptions; the former include Mathew's "The Unlearned Alchymist," 1660; Boyle's "Sceptical Chymist"; Euonymus, "Thesaurus de Remediis Secretis," Leyden, 1555; Fioravanti's "Cirurgia," Venice 1595; "La Chymie Charitable," par Demoiselle M.M., Paris, 1674; Jorden's "Discourse of Naturall Bathes and Minerall Waters," London 1632; and Glauber's "Pharmacopœia," Amsterdam, 1674. The whole collection is the property of Lord Lovelace, a direct descendant of Peter King, the cousin to whom Locke left this half of his library; it is on loan for exhibition until about May 20th, and may be seen at Messrs. Bumpus's premises at 350, Oxford-street, London, W.1.

DIPHTHERIA IMMUNISATION: A MISSTATEMENT.

A LETTER has appeared in Kentish newspapers, over the signature of H. W. McCleery, describing the last three sentences of an annotation entitled Diphtheric Immunisation in THE LANCET of Jan. 30th (p. 252) as "an admission of the utmost significance and importance." It is clear, we wrote, that toxin-antitoxin mixtures should be given up. "This toxin-antitoxin is," the letter states, "the immunising serum in general use." As far as this country is concerned the statement is untrue. For many years past the diphtheria prophylactic used for immunisation in Great Britain has been almost exclusively prepared from toxin detoxicated by formalin (toxoid) either in combination with antitoxin or alone. After the Bundaberg accident in 1928, the already strict regulations under the Therapeutic Substances Act were made still more strict regarding the preparation and testing of this type of prophylactic. For at least two years past it is probable that no toxin-antitoxin mixtures, properly so-called, have been sold in England. Immunisation has been carried out with toxoid-antitoxin mixtures or toxoid alone. It was clearly stated in the annotation that all possible source of danger can be avoided by using, instead of toxin, the modification of toxin prepared by heating it with formalin.

THE DESOUTTER CUSHION-JOINT FOOT.

Mr. Charles Desoutter, who devised the light metal limb of which some 5000 are being delivered each year, has now put on the market a foot joint which is a definite improvement on anything hitherto supplied. Wearers of existing models find it necessary from time to time to adjust and oil the joint mechanism and to fit new rubbers in position. By the introduction between the foot piece and the leg piece of a cushion unit which requires no such attention, the normal action of the gastrocnemius muscle in walking has been closely imitated and more elasticity given to the gait. The construction is simple, the so-called cushion-joint unit being fixed to the foot by a single nut, the tightening of which does not affect the working of the joint; the nut itself is locked by a serrated washer, and the whole is sealed by a sunk disc. The action can be regulated to suit every type of amputation. The foot is attached to a shin piece, drawn out of a flat sheet of dura'umin to avoid any danger of seam corrosion and breakage, which combines strength and lightness. The wearer of the artificial limb will certainly do well, if he can afford it, to try this new type of joint. The chief fitting centre of the Desoutter Service is at 73, Baker-street, London, W.1, with branches at ten provincial centres, as well as in Wales, Scotland, and Ireland.

MATERNITY AND CHILD WELFARE.—The National Conference on Maternity and Child Welfare will be held at the Guildhall, King-street, London, E.C., from July 4th to 6th. Before the conference, from July 1st to 3rd, there will be a clinical week-end for medical practitioners, arranged by the maternity and child welfare group of the Society of Medical Officers of Health. Visits will be paid to the Shadwell Hospital for Children and to the East End Maternity Hospital. The provisional programme of the conference may be had from the hon. secretary at 117, Piccadilly, W.1.